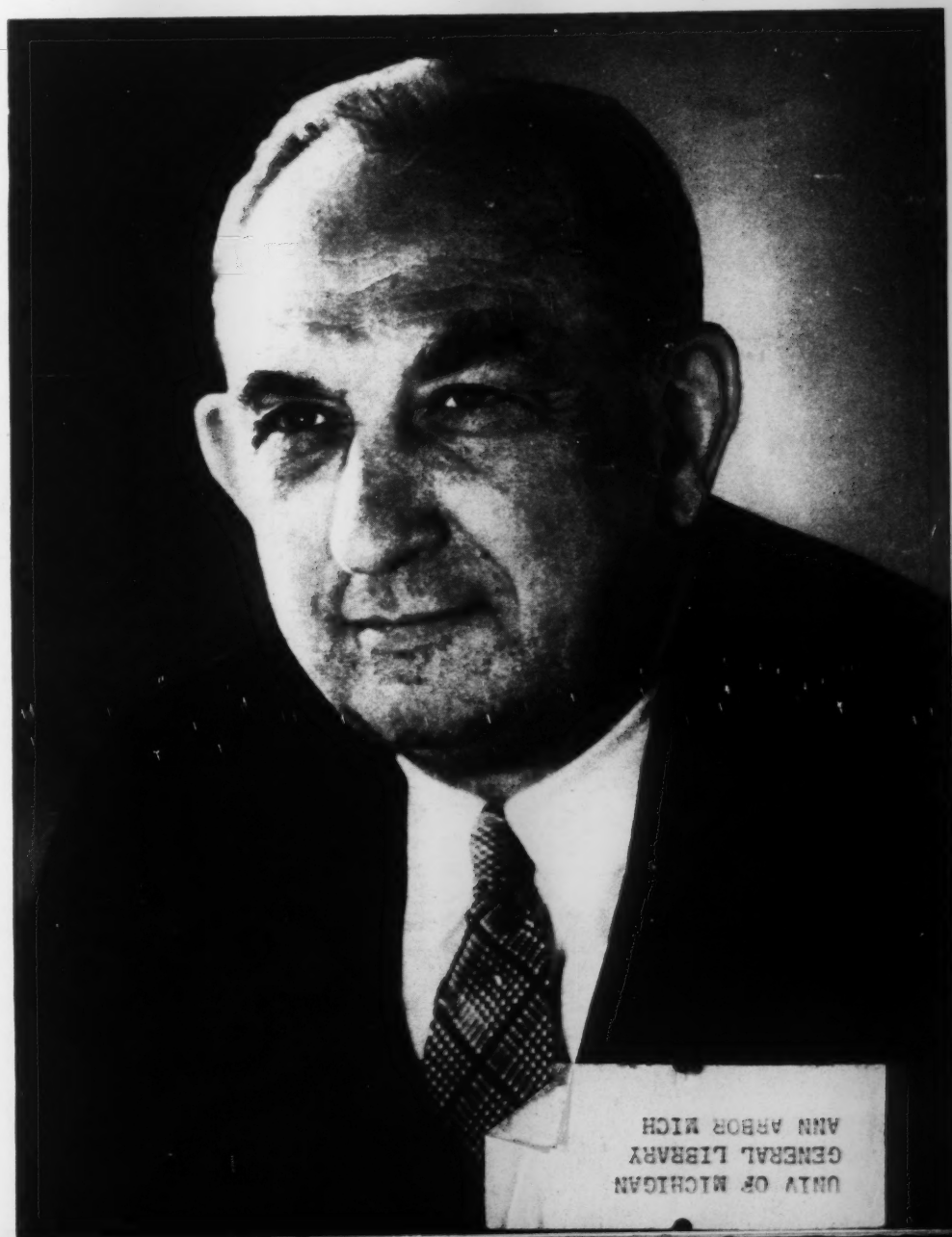
FEB 6 1948

# ENGINEERING NEWS-RECORD

NEWS ISSUE — JANUARY 29, 1948

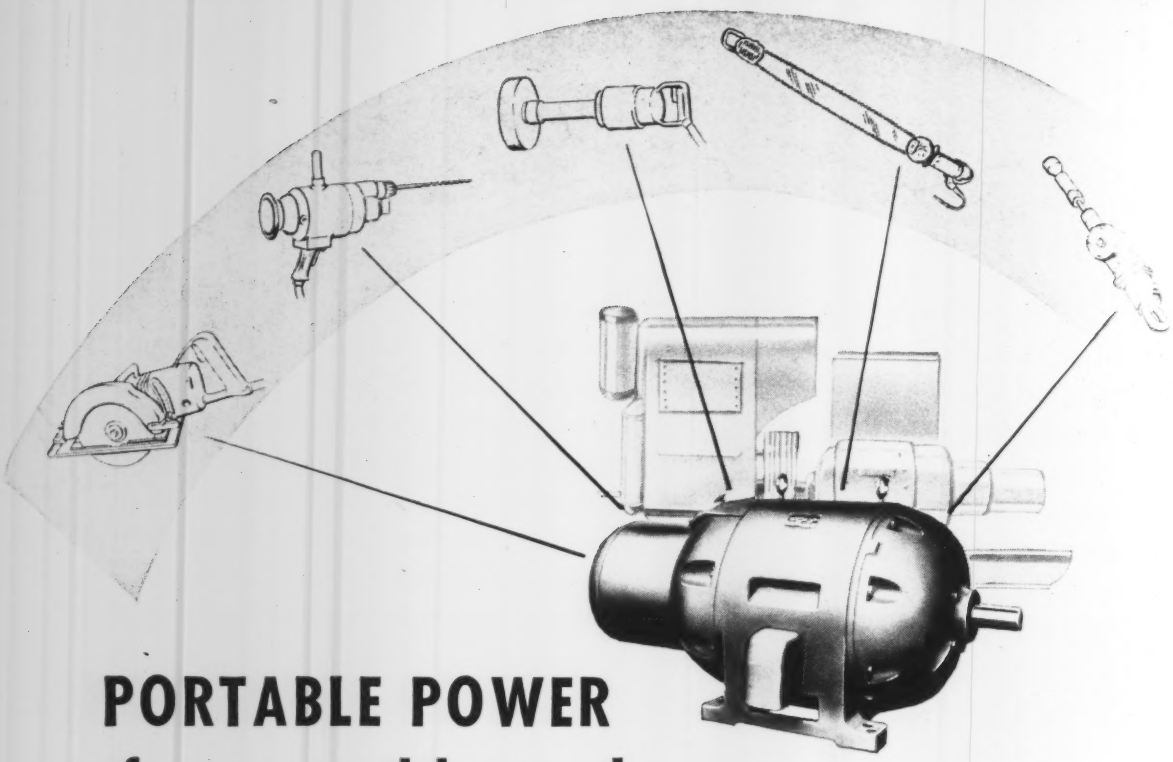


UNIV OF MICHIGAN
GENERAL LIBRARY
ANN ARBOR MICH

E. DOUGHERTY

AMERICAN SOCIETY OF CIVIL ENGINEERS
FOUNDED 1852

New President
A. S. C. E.



# PORTABLE POWER for portable tools

## Gas- or Diesel-driven Generators Work Long Hours in any Location with Minimum Maintenance

Muscle-saving, time-conserving power tools are multiplying like rabbits these days. Why? Because they increase labor's productivity, speed construction and raise profit margins.

To keep these tools sawing, grinding, drilling, tamping and sanding you'll need reliable, low-cost power such as derived from General Electric gas- or diesel-driven generators. The generating unit should be lightweight and easily portable so as not to limit the portability of the tools. Automatic regulating characteristics of G-E generators allow you to work right up to the load limit without watching instruments or risking damage to the generator. Many years of research and experience go into each piece of General Electric equipment you buy.

For these reasons we believe you will profit by specifying G-E on your next portable power plant. Make use of all the portable tools available which fit your operation, and be sure the heart of your power system bears the General Electric name. *Apparatus Department, General Electric Co., Schenectady 5, N. Y.*

**ELECTRIFIED CONSTRUCTION**

**BETTER PRODUCT LOWER COST**

**GENERAL ELECTRIC**

# News of the Week

ENGINEERING NEWS-RECORD • JANUARY 29, 1948 • VOLUME 140 • NUMBER 5

## Answers on Panama Canal given A.S.C.E. meeting

***Why a sea-level canal is recommended was explained to annual convention visitors in a 12-paper symposium. Power costs and toll roads also received attention.***

If the American people are willing to forego wartime security, the Panama lock canal can be improved to handle traffic satisfactorily for the remainder of this century at a cost of $130 millions. If both capacity and security are desired, the price tag can be expected to read $2,438 millions. Security requires that the present waterway be converted to a sea-level canal, and two years of extensive studies give re-assuring answers to all of the design and construction problems that such a great undertaking would involve.

In such plain and straightforward language Col. James H. Stratton, supervising engineer of the Panama Canal Special Engineering Division, opened a symposium on the future of the canal that dominated the ninety-fifth annual meeting of the American Society of Civil Engineers in New York Jan. 21-24, and composed at least half of the total convention program. Papers presented by the engineering heads of the various branches of the special engineering Division ranged from bank slope and channel design, including tidal current regulation, to design of special excavating machines and the construction methods required in their use.

Other features of the convention program included papers on the sanitation of rivers and harbors, on runway foundations for heavy airplanes, on problems of urban growth, on power-plant costs, on dam construction and methods of structural analysis and design.

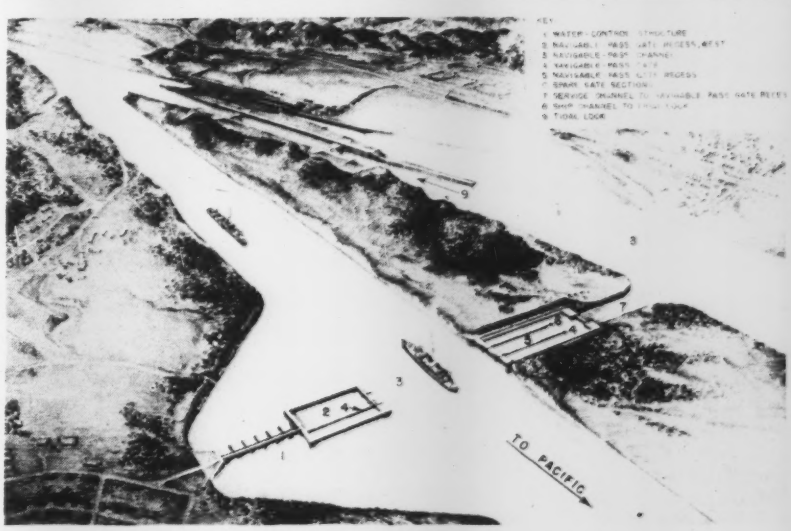
At special luncheon meetings, William L. Batt, president S.K.F. Industries, Inc. and Carlton S. Proctor, consulting engineer New York, appealed for support and understanding of the Marshall Plan on the part of engineers. Also at one of these luncheons, arranged by the Construction Division of the Society, J. P. H. Perry, vice president, Turner Construction Co. New York, in analyzing the future prospects of building construction emphasized that there has been no office building construction in 10 years, even in the face of great need, and that this need is also apparent in the field of hospitals and educational buildings. Prospects for large accomplishment, even in the commercial building field, are good despite high costs, in Mr. Perry's opinion, if the current difficulties in securing working capital are solved so that business can maintain and expand its operations.

In introducing the subject of the Panama Canal, Colonel Stratton described the main features of the sea-level canal that his studies revealed were necessary to meet the criteria of ample capacity and security. Its channel would be 600 ft. wide and 60 ft. deep. It would be equipped with tidal regulating works at the Pacific end that would limit currents to 2 knots and that would pass ships, two-thirds of the time through a lock and one-third of the time through a navigable pass. Temporary auxiliary locks would be built in the existing Third Locks Project cuts to handle shipping while the canal was being dug to sea level in one continuous operation.

A total of more than a billion yards of excavation, two-thirds dry and one-third wet, would be removed by special large equipment. For the dry work, 25 or 30 yd. shovels would be used loading into scows for disposal in Gatun Lake. Maximum cut depth is 660 ft. Hydraulic and chain bucket dredges, the latter to dig to the unprecedented depth of 145 ft., would handle the wet excavation assisted by dipper dredges to the 85 ft. depth. Hydraulic dredges would have 40 in. discharge and 2 cu.yd. buckets would be used on the chain excavators.

The canal would be insulated from

(*Continued on page* 11)




***Tidal Currents** in the proposed sea-level canal at Panama will be countered by a tidal lock (9) and by a regulating dam (1) and navigable pass gates (4) shown retracted into recesses (2) and (5). A spare gate is indicated by (6). Currents are small enough 8 hours out of 24 to permit ships to use the navigable pass (3) to avoid lockage.*

## NEWS IN BRIEF

*In telegraphic form, here are latest news developments on the engineering and construction front during the week.*

**Public construction**—Governor Hildreth of *Maine* has appointed a hospital survey committee to plan and take advantage of federal legislation making available $2,500,000 in five years for hospital construction . . . University of Kentucky, *Lexington, Ky.*, is to build a residence and dining hall for men to cost $1,900,000. . . . Five construction companies jointly submitted to the Corps of Engineers a low bid of $20,204,200 for the erection of the Mt. Morris Dam on the Genesee River in western *New York State*—about $4,000,000 over the government estimate. . . . A survey by the Business and Industry Foundation of the College of St. Joseph's in Indiana indicates that within three years Catholic institutional building and remodeling totalling ten billion dollars will get under way.

**Industrial construction**—Western Electric Co. is completing plans for a large factory at *Indianapolis, Ind.* . . . The Maine Development Commission says that *Maine* paper and pulp mills are scheduling total expenditures for construction and equipment in the next five years to amount to $25,000,000 . . . A 13-story office, theater and restaurant building will be built at Seventh Ave. and Broadway, *Manhattan, N. Y. City*, under the sponsorship of Herbert J. Freezer. . . . Liggett and Myers Tobacco Co. has given $2,000,000 contract to J. A. Jones Construction Co. for a new plant at *Durham, N. C.* . . .The Bond Store, Inc., State Street, *Chicago, Ill.*, will build a $2,000,000 store. Contract has been awarded to Sumner S. Sollitt & Co. . . . Pacific Gas & Electric Co. has made application to the Federal Power Commission for permission to build a $60,000,000 hydro-electric power development on the North Fork of the Kings River above the Pine Flat Reservoir site in *California*. . . . The Illinois Power Co. recently awarded the general contract for the construction of the building, river intake, water lines and other facilities for the first of its $15,000,000 power generating plant near Wood River in *Madison County, Ill.*, and also constructing a large plant on the Illinois River near *Havana, Ill.*

**Housing**—A $1,300,000 apartment house is to be built in the Wynnewood Addition at *Dallas, Tex.* . . . Builders have broken ground for the first apartments in a group of six buildings to go up on Garth Road near the Harlem R. R. station at *Scarsdale, N. Y.* Builders are Frank Morell Const. Co. . . . A $1,000,000 co-operative apartment structure is planned for *Miami Beach, Fla.* . . . F. B. Garrison will build a $1,786,699 apartment project in the Chantilly section of *Charlotte, N. C.* . . . Construction on another New York apartment development got under way this month when the Rocky Hill Garden Apartments Corp. began a 234-unit apartment project in Bayside, Queens.

**Highways**—W. T. Halcomb, state highway engineer, sets the cost of highway construction and maintenance in *Nevada* for this year at $10,680,400. . . . Only 75 miles remain to be completed on the 385-mile Grimshaw-Hay River highway in *Northwest Canada*. . . . Work is being rushed on the $530,000 bridge across the Arkansas River near *Jenks, Okla.* . . . Federal approval of the proposed $7,000,000 Turtle River bridge at *Brunswick, Ga.*, is being sought by the state highway department. . . . A Bee Line highway from *Clearwater* to *Miami, Fla.*, is being considered . . . It is said that loss of potential revenue to the state highway department, estimated at several hundred thousand dollars a year, will result from the ruling of the Supreme Court in *Mississippi* in holding that original landowners retain oil and mineral rights on highway rights-of-way. . . . The failure to back bonds of the Mystic River Bridge Authority by *Massachusetts* state credit has automatically raised fixed charges by more than $400,000 a year, ultimately adding $12,000,000 to the cost of the bridge.

# Draft Arizona underground water code

With sharp controversy expected in legislative debate, an underground water code is being drafted for presentation to the second 1948 special session of the 18th Arizona Legislature. The body is now in its first special session to discuss an Arizona Interstate Stream Commission, and a second session is expected to be called to consider the water code.

Enactment of the code is deemed vital to the state's success in developing the Central Arizona Project to bring 1,065,000 ac.-ft. of Colorado River water into the area.

Gov. Sidney P. Osborn called the session in the hope that a suitable code can be enacted before the state faces a showdown in Congress over approval of appropriations for the Central Arizona Project.

However, opposition factors hold out against restrictions, claiming all water under their land belongs to them to pump as they please.

A recent survey showed that for lands already overpumped from 1½ to 18 times, there were on file 544 notices of intent to drill wells. They cover a total of 161,125 acres, although not all are for development of new lands.

Designed to regulate and control the use of groundwater in the state, the code will give far-reaching power to the office of the state Land and Water Commissioner, who will be given authority to make many decisions affecting agriculture and economy of the state.

The code will define groundwater as "all water of underground streams or channels, artesian basins, whose existence or whose boundaries may be reasonably established," and will determine conditions under which well applications may be presented and water pumped. Penalties for violations also are provided.

Held in abeyance pending action by the legislature is a separate groundwater control program voted by the Salt River Valley Water Users Association whose board of directors recently assumed authority over all groundwater pumping on lands under their jurisdiction.

Mindful of the alarming drop in the underground water table in the Salt River Valley, the Water Users moved to prohibit further exploitation by drilling of private wells and to take over distribution of all private wells now pumping for agricultural use. (*ENR* Dec. 18, 1947, vol. p. 837).

**ENGINEERING NEWS-RECORD.** Published every Thursday. **Publication office: 99-129 North Broadway, Albany 1, N. Y. Return postage guaranteed. Editorial and Executive Office: 330 West 42nd St., New York 18.** Vol. 140, No. 5. Price 35c per copy. Allow at least ten days for change of address. All communications about subscriptions should be addressed to the Director of Circulation, 99-129 N. Broadway, Albany 1, N. Y., or 330 W. 42nd Street, New York 18, N. Y. Subscriptions United States and U. S. Possessions, $6.00 for one year, $9.00 for two years, $12.00 for three years. Canada $7.00 for one year, $11.00 for two years, $14.00 for three years. Latin American countries $10.00 for one year, $16.00 for two years, $20.00 for three years. All other countries, $20.00 for one year, $30.00 for two years, $40.00 for three years. Please indicate position and company connection on all subscription orders. Entered as second class matter October 29, 1936, at the Post office at Albany, N. Y., under the Act of March 3, 1879. Printed in the U.S.A. Cable Address: "McGraw-Hill New York." Member A.B.P. Member A.B.C. Copyright 1948 by McGraw-Hill Publishing Company, Inc. All rights reserved. JAMES H. McGRAW, Founder and Honorary Chairman; JAMES H. McGRAW, JR., President; CURTIS W. McGRAW, Senior Vice-President and Treasurer; JOSEPH A. GERARDI, Secretary; NELSON BOND, Director of Advertising; EUGENE DUFFIELD, Editorial Assistant to the President; and J. E. BLACKBURN, JR., Director of Circulation. District Managers and Branch Offices: Fred G. Hudson and L. H. Hunt, 520 N. Michigan Ave., Chicago 11; 738-39 Oliver Building, Pittsburgh; J. W. Otterson, 68 Post St., San Francisco 4; Aldwych House, London, W. C. 2, England; Washington; J. M. Spackman, New York; A. B. Cozzens, Philadelphia; E. E. Duff, Jr., Cleveland; B. F. Horn, Detroit; W. E. Donnell, St. Louis; R. N. Phelan, Los Angeles; W. G. Pacific Coast; Ralph Maultsby, Atlanta, Ga.

# Waterworks need large rate increases to finance new construction

***New York State Section of American Water Works Association told that 20 to 40 percent rate raises are needed***

U. S. waterworks systems should invest $345,000,000 annually in the next five years to "catch up" with deferred construction and meet new demands, the New York State Section of the American Water Works Association was told in New York City last week.

Pointing to an 8-year deficiency amounting to $600,000,000 in needed improvements, Louis R. Howson, Chicago consulting engineer, told the group that on a 5-year basis the waterworks industry needs to spend nearly 62½ percent of its annual gross revenues in order to meet its obligations.

To finance such a program and cover rising expenses that now consume more than 59 percent of gross revenues, he said, water rates would have to be raised at least 40 percent.

Developing this statement further, Mr. Howson pointed out that such a capital expenditure would represent two and one-half times that spent annually for new construction in the period between the two wars.

If construction is spread over ten years, the annual capital expenditure for new works would be $285,000,000 or 55½ percent of gross revenue, and a revenue increase of about one-third would be needed to finance the capital outlay. Mr. Howson continued: "Even if no attempt is made to compensate for construction deferred during the war period, an increase of about 20 percent in revenues is indicated to provide the same facilities as prewar." However, he suggested that this may be a low estimate because "it assumes the full impact of wage increases was reflected in 1940 operating statistics."

In connection with these analyses, Mr. Howson said that "the best-operated municipal waterworks endeavor to build, so far as possible, from current revenues. As a long-term policy, it is approximately 40 percent cheaper to build from revenues than by financing through bond issues."

#### Wages and construction costs

The close relationship between wages and construction costs was demonstrated by comparing statistics based on 1913 equal to 100. The average hourly wages of all building trades including helpers stood at 500 as of Dec. 1948, while the *ENR* construction cost index of the same date was 432.3. This reflects 86½ percent of the labor wage increase, Mr. Howson said.

Expressing a fear that water utilities were not sufficiently concerned about their rate structures and their ability to finance new construction from revenue, Mr. Howson reported that only a few organizations have increased their rates. On Feb. 1, 1947 St. Paul, Minn. put into effect a 10 to 45 percent increase, averaging 25 percent overall, while Syracuse, N. Y. raised rates 50 percent last year. A middlewest private utility recently secured rate increases through the Public Service Commission averaging 31 percent for 14 of its 16 properties.

The spring meeting will be held in Syracuse on April 1 and 2.

## Highway transportation meeting May 6-7

Washington, D. C., has been selected as the city for the Second Highway Transportation Congress of the National Highway Users Conference, it has been announced by Arthur C. Butler, N.H.U.C. director.

The congress, to be held May 6 and 7 at the Mayflower Hotel, will be attended by representatives of many of the 1,000 national and state highway-user groups.

The first of the biennial congresses was held in Washington in 1946.

## Engineers speed repairs on Peace River bridge

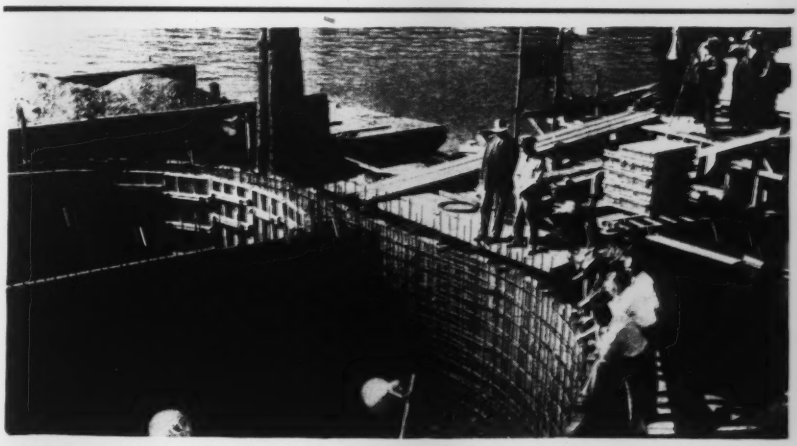
The Royal Canadian Engineers have started repairs on the 2,130-ft. Peace River Suspension Bridge on the Alaska highway, work to be completed before the spring freshets.

The bridge, built by the U. S. Public Roads Administration during the war at a cost of $4,000,000, crosses the Peace River between Dawson Creek and Fort St. John, B. C. During inspection last summer engineers discovered that the current had scoured a hole 30 ft. square and 8 ft. deep in the gravel under the north pier. The Army plans to place the whole concrete pier on a firm foundation. A temporary trestle bridge has been built from the shore to the weakened pier, and from that point a steel sheet piling cellular coffer dam will be sunk around the pier, preliminary to foundation work.

## Minimum water rates lowered in Albuquerque

A reduction of minimum rates charged by the city-owned water system of Albuquerque, N. M., has been voted by the city commission. The reduction, estimated to save consumers $42,000 annually, drops the minimum for customers inside the city limits from $1.25 to $1.00 monthly, and the minimum for those outside the city from $2.25 to $2.00.

City manager H. W. Rankin said the water department now has surplus funds estimated at $525,000.



***Mooring Island*** *—Now nearing completion at the Bremerton, Wash., navy yard is one of 40 mooring "islands" to be used for laying up part of the navy's fleet in storage. Steel piles up to 120 ft. long are driven into bay in cells to form a clover-leaf structure, filled with gravel and capped by 3 ft. slab of reinforced concrete. Reinforced concrete trestles 16 ft. wide provide access to the islands for utilities and servicing. Contractor on the $7,000,000 job was the General Construction Co., of Seattle.*

## DEVELOPMENTS BEYOND U. S. BORDERS

***Hydro-electric projects occupy world attention—French begin operation of Genissiat Dam—Puerto Rico pushes $20 million works program—Other foreign news***

**France**—The waters of the upper Rhone River were being impounded last week into the 14-mile long reservoir behind Genissiat Dam, 31 miles southwest of Geneva, after temporary outlet channels on both sides of the dam were closed and the river returned to its normal bed.

Under construction since before the war, the Genissiat development (*ENR* Feb. 13, '47 vol. p. 245), will have an initial installation of four 70,000 kva. generating units and will be the largest hydro-electric station in western Europe. Power will be generated through six parallel penstocks spaced along the face of the dam providing a head of 200 to 225 ft. The first of the turbines is to begin test runs in about a week and no power will be produced for industrial consumption for at least another month.

**New Zealand** — Hydro-electric construction projects in New Zealand absorbed nearly one-third of all workers employed in public works construction, according to recent government figures. Government officials said that the emphasis on hydro work has come about through an increase in costs that makes thermal power cost from 10 to 15 percent more today than it did in 1938 and has also increased operating costs. In view of the island's acute power shortage, there would still be room for thermal plants if they could be erected quickly, but the government has been unable to get assurances of delivery in less than four or five years.

A total of 3,675 construction workers is employed in hydro-electric projects at the present time.

**India**—Reportedly disheartened by the long delays involved in receiving heavy hydro-electric equipment from American and British concerns, the Indian government is now surveying the possibilities of placing some orders for equipment with Czechoslovakian organizations. Seeking to implement a long-range program of major multi-purpose river control projects, government officials have been told that they may expect two and three year delays in receiving any generating equipment. Although the situation is far from urgent, since the projects where the equipment will be needed have hardly progressed beyond the survey and blueprint stage, it was understood at New Delhi that Czech firms have been approached on the subject of furnishing power equipment, but as yet there is no definite information as to whether that plan can be carried through.

**Egypt**—Still another plan for full utilization of the waters of the Nile river was advanced at Cairo last week when proponents revealed a plan for a $2,000,000,000 project to completely utilize the river's water.

A. Daninos, an Egyptian engineer who recently returned to Egypt after a three months study of the Tennessee Valley Authority's program in the United States, said that the project, which contemplates a huge dam near the present site of Aswan dam, would double the country's arable land and form a reservoir four times the size of Lake Mead at Hoover Dam in the United States.

An international syndicate is being considered to handle the project's finances.

*British Combine photo*

***Reclaim Lumber**—Three wartime emergency bridges—erected in 1940 as an insurance against traffic dislocation by bomber, are being demolished so that the timber used in them may be used to reconstruct damaged houses in London, England. The first bridge to go is a temporary structure at Millbank, over the Thames. Most of the lumber in this bridge is pine.*

### Public Works

**Puerto Rico**—The Department of the Interior is now pushing a vast public improvement program calling for the immediate expenditure of about $20,000,000 on construction.

The program calls for the construction of roads, schools, public buildings and other works.

A second part of the public works program will cover construction of vocational schools of arts and trades for war veterans, probably in Ponce, Arecibo, Mayaguez and other communities. Orders for the purchase of steel for these structures are said to have been already placed in the United States.

Meanwhile, the government announced the signing of a $500,000 contract with the Long Construction Co. of Charleston, S. C., to cover construction of a 3½ mile highway to be known as Eleanor Roosevelt Boulevard in Puerto Nuevo. The asphalt road will connect insular military highway No. 2 to a housing project.

### Miscellany

**Holland**—The International Congress on Soil Mechanics will definitely be held in Rotterdam from June 21 to June 29, 1948, in conjunction with the International Congress on Underground Town Planning.

**England**—The Public Health and Municipal Engineering Congress and Exhibition will be held at Olympia, London, from Nov. 15 to Nov. 20, this year.

**South Africa**—The Southern Rhodesian government is now considering plans for a $10,000,000 expansion at the port of Beira in order to extend the port's capacity for shipment of chrome ore and other products of that part of the country.

**Russia**—Construction has started on a major project in Soviet Turkmania—major source of that country's long staple cotton—to convert more than a half million acres of Kara-kum desert into cotton plantations to help the Russian economy.

Among the items to be constructed are a 270-mile irrigation canal from the Amu-Darya river to the Murgab and Tedzhen oasis.

The project is being built by a construction agency recently set up by the Soviet Turkmania government after detailed plans completed last year had been approved.

# Photogrammetry holds out savings on highway, general mapping projects

## American Society of Photogrammetry meets at Capital to hear newest developments in field

Large cost savings on mapping work are possible by use of photogrammetric methods now being perfected, the American Society of Photogrammetry was told last week at its annual meeting in Washington, D. C. New equipment being developed will make the advantages of these methods even greater, nearly 1,000 engineers attending were informed.

On highway work, photogrammetric methods are as superior to older mapping procedures as the typewriter is to longhand writing, it was asserted by Wm. T. Pryor, who served as engineer in charge of design for the Public Roads Administration for 600 miles of the Alaska Highway. "Photogrammetric methods were used to good advantages on that portion of the road, but today even greater benefits could be obtained with the better methods and equipment available," he said.

Mr. Pryor emphasized that this procedure permits production of accurate contour maps with a small contour interval, and will also supply much information on the use of the land covered. Since this information, as well as the topography, must be evaluated in determining the value a highway will have to the travelling public, the added data are of great importance.

### Methods used on federal work

All federal agencies are using the new procedures on their mapping programs, according to Robert H. Randall, chief of the staff of the Bureau of the Budget that is concerned with mapping and surveying work.

Because only about half of the area of the United States has been covered by topographic maps, and since most of those are now obsolete or were made to a scale too small, the Geological Survey has launched a 20-year program of great scope, Gerald FitzGerald, chief of the survey's topographic branch, reported. Mapping operations are now in progress on approximately 196,000 sq. mi. These maps will be completed within the next three years.

However, to accomplish the goal of completing topographic mapping of the entire U. S. will require tripling the current activities of the survey. Mr. FitzGerald said. Although the survey's work still requires some surveys with transit, level, and planetable, aerial photography and photogrammetry effect a great time and cost saving and permit a much larger part of the work to be done in the office unhindered by weather conditions.

### New equipment is developed

Equipment and methods now being developed by research work at the photographic laboratory at Wright Feld, Ohio, were described by James E. Henry, chief of the aerial photogrammetry unit at the laboratory. Special projects now in progress deal with barometric altitude studies, stabilization of camera mountings by use of better gyros, new designs of viewfinders, and work with new straight-line indicators. Progress to date has given great promice for more precise maps and charts.

**EDMOND S. MASSIE, JR.**
*New head of mapping group*

Pioneer work with the helicopter to obtain aerial photographs and to assist on special aerial studies was outlined by V. R. Short, of the Sikorsky Aircraft Division of the United Aircraft Corp. Although much difficulty from vibration of the aircraft was encountered on the first studies, indications are that the helicopter will prove of great value for special work at low altitude and on days when weather permits operations by other craft only at higher altitudes.

The session that brought forth the most discussion was the panel program dealing with education in photogrammetry, with G. C. Tweinkel of the Coast and Geodetic Survey presiding.

Prof. A. O. Quinn of Syracuse University reported that one of the major difficulties today at universities in giving instruction in photogrammetry and related work is in obtaining qualified instructors. Only $1,500 worth of special equipment is needed to teach a class of 15 students in photogrammetry, he revealed.

Professor Quinn does not believe in granting a degree in photogrammetry. Instead, he recommends that the student obtain a C. E. Degree from a school giving a course in photogrammetry and then specialize when he gets out of school. This view touched off much comment from the floor, but the resulting discussion revealed no general opinion as to the best plan.

Another highlight of the meeting was a brief address by B. Scherphier of the Netherlands, secretary-general of the International Society for Photogrammetry. In this country on official business, Mr. Scherphier reported that the Sixth International Photogrammetry Congress and exhibition would be held at the Hague, Sept. 1 to 10, and that photogrammetrists from all over the world are expected.

### Two awards made

Harry T. Kelsh, in charge of field mapping and control with the Soil Conservation Service, was presented the Fairchild Award for research and development of the Kelsh plotter, an instrument created to maintain the simplicity of a project system in the compilation of maps from aerial photographs.

Wm. T. Pryor, since 1930 with the Public Roads Administration, won the Talbert Abrams Award, given for outstanding articles published in *Photogrammetric Engineering*.

Esmond S. Massie, Jr., who has been with the Department of Agriculture since 1934 and is now in the division of engineering of the U. S. Forest Service, was elected president of the society for the coming year.

A 1927 civil engineering graduate of the University of South Carolina, Mr. Massie succeeds R. G. Sanders of Fairchild Camera and Instrument Corp. Other new officers are: First vice-president, Geo. G. Tschume, of Bausch-Lomb Optical Co., Rochester, N. Y.; second vice-president, P. G. McCurdy of the hydrographic office of the U. S. Navy; and secretary-treasurer, T. W. Norcross, who recently retired as chief engineer of the U. S. Forest Service.

## Army advances plans for Indiana dam

Planning for Cagles Mill Dam, a flood-control project to be built on Mill Creek, 15 miles southeast of Brazil, Ind., is well advanced, Army engineers said last week.

Construction of the 124-ft. high structure will require removal of about 6,000,000 cu.ft. of earth. The lake will be 2,000 acres in area.

# MEN AND JOBS

**Ralph E. Roop** has been re-appointed city engineer for Decatur, Ind. He also will serve as superintendent of the water works department.

**W. J. Moore,** recently with the U. S. Army Corps of Engineers as engineer of flood control projects in southern New York State, has been named field engineer of public works for the Portland Cement Association in Connecticut, succeeding C. N. Wiley. Mr. Moore was graduated from Purdue University with a B.S. degree in civil engineering. Before joining the U. S. Army Corps of Engineers, he had been associated with the state highway departments of New York and Indiana.

**Joseph Mack** has been appointed San Diego County, Calif., surveyor. He has been a county employee since June, 1938, when he was appointed draftsman in the road department.

**F. G. Eric Peterson,** structural engineer, has been appointed a member of the city planning commission of El Cerrito, Calif.

**John G. Little,** San Francisco superintendent of building inspection, has been appointed consulting engineer for the Golden Gate Bridge and Highway district, succeeding the late Leon H. Nishkian.

**Vaughn Wood,** civil engineer, has been appointed road commissioner of Imperial County, Calif. He will direct a 1948 road construction program calling for the expenditure of more than $1,652,000.

**Charles H. Williams** has been appointed resident engineer in charge of work on a new water system at Westport, Wash. He was city engineer and water superintendent of Olympia, Wash., for 19 years until his recent resignation.

**Walter J. Kackley** has resigned as consulting engineer for the Public Buildings Administration, Federal Works Agency, Washington, D. C., to join the engineering staff of the U. S. Atomic Energy Commission at Washington. Prior to joining PBA, Mr. Kackley was engaged in engineering and construction in the South and the West where he was identified with many large railroad and bridge projects.

**Murray A. Stewart,** formerly deputy city engineer of Toronto, Ont., has been appointed works commissioner. A graduate of the University of Toronto in civil engineering and an employe of the city for 40 years, he succeeds the late George C. Powell.

**Ernest M. Hays,** former head of the Sherman, Tex., street department, has left for Daharan Saudi, Arabia, to become paving engineer for the Arabian-American Oil Corp. He formerly served two years as an Army engineer and two years with the Pan-American Airways at Natal, Brazil.

**Maj. Robert E. Clark** of Washington, D. C., until recently at Sendai, Japan, is now executive officer for the St. Paul District, Corps of Engineers. He succeeds **Emil Silverman,** who now heads the Contract Construction Branch of the St. Paul District office. Major Clark has been plans and operations

*In a conversational huddle at the 16th annual convention of the National Reclamation Association at Phoenix, Ariz., are left to right; Hampton Godbe, secretary of the Salt Lake City Metropolitan Water District; Fred E. Buck, Montana state engineer; Gerald Irvin, Salt Lake City, of the Utah Power and Light Co. and W. R. Wallace, dean of Utah reclamationists.*

*Planned development of the entire Colorado River basis was urged by William Warne (center), assistant Secretary of the Interior, at the 16th annual convention of the National Reclamation Association at Phoenix, Ariz. At left is Vaud Larson, engineer in charge of project planning in Arizona, and E. A. Moritz, Boulder City, Nev., director of Region III for the bureau, which includes all of the lower basin.*

officer for the 583rd Engineer Construction Company, which builds homes for families of military personnel stationed in the Sendai area. Major Clark saw action with the 534th Engineer Boat and Shore Regiment on New Guinea, Morotai and Luzon.

**Bert Hanson** has been appointed engineer of Fayette County, Iowa, to succeed A. D. Finch, resigned.

**Osborne Mitchell,** a member of the Professional Engineers Corporation of Ontario and late Secretary of the Hydro Electric Power Commission of Ontario, has become secretary of the Brazilian Traction Light and Power Co. Ltd., Toronto, Ont. Mr. Mitchell was graduated at the Northampton Engineering College (University of London) in 1922.

**Archie B. Uzzle, Jr.,** assistant superintendent of the water department of Raleigh, N. C., and an employee of the department for the last 20 years, has resigned to become city engineer of Canton, N. C.

**R. E. Davey,** Toronto, Ont., has been appointed city engineer of Trenton, Ont., succeeding **F. T. Brown** who resigned to join the Toronto Transportation Commission.

**William O. Barnard, Jr.,** who received his civil engineering degree from North Carolina State College, and who has been construction engineer for the Farmers Federation, at Asheville, N. C., since his discharge from the Army Air Corps in 1946, has been named superintendent of the federation's eight freezer locker plants in Asheville, Spruce Spine, Brevard, Spindale and other western North Carolina points. He was in charge of building many of the plants.

**F. W. Sarvis,** Henry County, Ia., engineer, has resumed his former position as Keokuk County engineer, replacing A. O. Bossard who held the Keokuk County post during 1947.

**Lt. Col. Donald A. Elliget,** recently executive officer to the 3rd Engineers in Germany, has been named executive assistant to Col. Orville E. Walsh, Portland district Army engineer, with headquarters at Portland, Ore. After having been graduated from the U. S. Military Academy in 1935, Elliget studied engineering for two years at the University of California. Before the war he engaged in mapping operations with the 29th Engineers battalion. During the war he served in three campaigns in Europe.

(Washington Star photo)

*Nathan C. Grover (left), for 26 years chief hydraulic engineer of the U. S. Geological Survey and now a special consultant to that agency, recently received the award for outstanding professional accomplishment from the Washington Society of Engineers. He is shown with Gordon Fox, vice-president of the Freyn Engineering Co., Chicago, the principal speaker at the society's annual banquet.*

*Looking at an experimental welded steel pile to be driven into the heavy boulder formation at the Arroyo Hondo bridge site on the federal aid project north of Taos, N. M., are, left to right, Hoyle Lowdermilk of Lowdermilk Brothers, contractors; K. D. McCrary, assistant district engineer, and Lee Campbell, assistant bridge engineer, both of the N. M. highway department.*

*Charles Jackson, resident engineer for the Corps of Engineers, maps out construction schedules to rush work on the giant multi-purpose Allatoona Dam near Cartersville, Ga.*

*S. N. Pearman, recently named state highway engineer for the South Carolina State Highway Department, has been with that department since 1924.*

***North Carolina's longest primary highway grading job on U. S. Route 29 near Greensboro is inspected by P. W. Owen (left), of Pullen & Owen, the general contractors; W. Vance Baise (center), state highway engineer for the North Carolina State Highway and Public Works Commission, and T. V. Fahnestock, bituminous engineer for the road department.***

# HIGHLIGHTS OF MUNICIPAL DEVELOPMENTS

*Summarizing current activities in city engineering and construction throughout the country.*

***Delay in construction of Los Angeles incinerators—Traffic control plans—Building code revisions—Omaha sewer costs go up—Sanitation programs discussed***

Proposed construction of a chain of incinerators in Los Angeles County, Calif. (*ENR* Dec. 12, 1946, vol. p. 793) has been stalled by an investigation that involves the entire problem of controlling southern California's "smog."

Only one of the $900,000 burners has been built, and the future of the program seems to hinge on an investigation by the Los Angeles city council into charges that the incinerator gives off too much smoke and soot, and that there was something wrong with the contract under which the Griffith Company built it last summer.

The incinerator under investigation consists of four revolving kilns with an aggregate burning capacity of nearly 1,000,000 lb. of rubbish a day. It first went into operation last Oct. 20. It had been operated barely six weeks, for testing purposes, when an explosion injured five workmen, caused a shutdown and brought about the council investigation. The city's agreement with Griffith provides that the city need not accept the project until it has been operated satisfactorily.

Everyone connected with the incinerator project insisted that the design was good and that, once it can be operated at capacity 24 hours a day it will work without giving off more than the legal minimum of smoke.

The city's air pollution control director, H. E. Kunkel, said that in two months his staff made 27 tests and only nine times found smoke greater than the permissible levels, adding that near-by dumps were smoking much more than the incinerator.

Emerson Milner, Griffith civil engineer in charge of the incinerator, said there was no question it would work. The contract called for a minimum of 7 percent carbon in the residue. Milner testified the highest unconsumed carbon rate during incinerator tests was 3.6 percent.

H. P. Cortelyou, who recently retired as engineer-director of the city's bureau of maintenance and sanitation, also upheld the soundness of its design. A pilot plant build in Vernon, Calif., worked satisfactorily, he said.

Three more incinerators have been authorized by the city's voters in a bond election, but when and where they are built and what kind they will be won't be known until the fate of the Griffith Company's project is settled.

If it is accepted, the city will pay for it at the rate of $7,469.97 a month under the complex lease agreement and will get full title after 10 years with options to buy before that time.

Further investigation of the explosion was demanded by members composing the council.

## Highway, street plans

Originally estimated to cost about $5,000,000, the Pasadena tunnel at Houston, Tex., now is estimated to cost about $7,512,000. A coming bond issue will supply money to supplement the $5,012,000 on hand for the construction, as well as to establish a contingency fund for purchase of rights of way for state highways in the county, including approaches to both tunnels.

The long-awaited construction of six new railroad bridges over the Cuyahoga River at Cleveland, Ohio, and improvements to two others to provide better clearance to vessels headed for upper river docks took a big step forward recently when representatives of seven railroads and the United States Corps of Engineers agreed on the procedure for the division of costs and construction in the $12,000,000 program.

About $9,000,000 in federal-state highway money allotted to Cleveland is unspent, awaiting for plans of the city's proposed freeway system.

The county engineer's office at Akron, Ohio, reports that work on a new high level bridge across the Cuyahoga River will be started soon and should be ready next year. The project has been approved by the U. S. Bureau of Public Roads.

***Caisson for Rock***—In Seaside, Ore., where loose rock in soil makes orthodox pole-hole digging impossible, the Pacific Power & Light Co. uses metal caissons to keep the falling rock from filling the hole while the digging proceeds. H. C. Thorn, PP&L district manager, points to the caisson, which is placed by crane, and lowered as one man inside digs out the loose material. Caisson is 6 ft. in length and 3 ft. across.

## New Fort Wayne plan

The old practice of the management of all city utilities by a general superintendent responsible only to the Board of Works, has been dropped by the new city administration of Fort Wayne, Ind. It has been replaced by a system requiring each separate division of each utility to report directly to the board, with no centralized program of administration except as vested in the board itself.

Under the new system, the construction, engineering, bookkeeping, business, filtration plant, generating station and sewage treatment plant heads would report directly to the board. It is said the superintendent will be largely bypassed in actual management of the utilities.

## To ease traffic

The Metropolitan Transit Authority, formerly the Boston Elevated Street Railway, will replace rail service in the Greater Boston, Mass. area this year with a trackless trolley plan. The districts involved at the start are Dorchester and Roxbury.

The Dorchester-Roxbury program is part of an overall project designed to substitute trackless trolleys for the track-bound street cars in Metropolitan Boston as soon as the old fashioned cars are ready for the junk heap.

Trackless trolleys were introduced into Metropolitan Boston in 1936 and since then 17 similar trolley lines

with a total length of 187 mi. have replaced rail service.

From the passenger's viewpoint, the trackless trolleys have been found speedier; closer to the curb for alighting purposes; and more comfortable. From the standpoint of the autoist who must compete for driving space with buses and trolleys, there is less likely to be congestion resulting from the immobility of track-bound cars.

Minneapolis, Minn., is considering a proposed downtown parking garage to be built by the city.

The Van Wert, Ohio, city treasurer reports that the 138 parking meters installed more than a year ago netted the city $11,842 in 1947.

The Mayor's traffic and parking committee of Omaha, Neb., is looking for suggestions in connection with its scientific study of the city's traffic problems.

It was estimated that additional protection for 200 grade crossings in Virginia will cost $5,000,000.

## Building code revision

Construction of rental housing in Minneapolis would be greatly encouraged by revision or re-interpretation of two sections of the city's building code, according to a study by a Minneapolis Contractors' and Builders' association.

If the code were amended to permit more than one basement apartment, building owners would receive about 10 per cent more in rentals, according to R. F. Fritz, committee chairman. The St. Paul building code allows two basement apartments.

The committee also suggested re-interpretation of the section of the code calling for two "remotely located" means of entering and leaving a building housing more than two families.

The committee contends a practical interpretation would permit adjoining stairways if a standard fire wall separated them.

"The effect of such an interpretation," according to Fritz, "would permit a re-design of buildings such as 8-family apartments which would give greater usable floor area. This, in turn, would permit more dwelling space and higher mortgage loan commitments."

## Sewer costs going up

Omaha, Neb., found itself facing the need to ask voters for nearly $3,160,000 additional in bonds to finance a proposed municipal auditorium that was to have cost (two years ago) $3,540,000.

A special committee appointed by the mayor, after a lengthy study of the proposal, said the auditorium now would cost in the neighborhood of $6,-648,830, and added money is needed.

***Open Campbell Dam Sluices**—First water roared through triple sluice gates in the head dam of the British Columbia Power Commission's John Hart power development at Campbell River recently. The project, to supply power to industries and communities on north Vancouver Island, is the first step in a larger development expected to produce an ultimate 180,000 hp. Built by the General Construction Co., Ltd., of Vancouver, at a contract cost of $1,295,000, the dam is 85 ft. above the river bed, and the sluice gates are 30 ft. square.*

## Plumbing code

Los Angeles, Calif., has adopted a new plumbing code making plumbing regulations uniform throughout most of southern California. The old code had not been revised for 20 years. The new Uniform Plumbing Code recommended by the Western Plumbing Officials' Association, is now being used in some 100 cities and counties.

Typical of the improvements in the new ordinance is its specifications for sizes of gas pipes and vent, waste and water pipes, offering a flexible system for determining the size needed.

## Sanitation programs

To determine the needs for a 5-year sewer and road improvement program in Hamilton County, Ohio, which would be financed by bond issues submitted to the voters next November, a survey was decided upon at a recent meeting of Cincinnati and county officials.

The Indiana Stream Pollution Control Board has approved plans for a new sludge disposal system at Indianapolis to cost $2,500,000. Other projects, bringing the total of approved work to $3,450,000, include sewers in two Fort Wayne streets, sewer system and sewage treatment plant at Lakeville near South Bend, waste treatment works for a Farmer's Co-Op creamery at Remington, an oil separator system at Republic Creosoting Co., Indianapolis, and temporary sewage disposal plants at Bedford Heights, the new subdivision of Indiana Limestone Co., Bedford.

Requests to extend time for completion of projects were denied for Sheridan, Decatur, Munster, Kentland Dairy Products at Mulberry, Indiana Condensed Milk Co. at Sheridan, and Warner Gear Works at Muncie.

Plans are proceeding well for a new sewer system at Tampa, Fla.

Altoona, Pa., has been ordered by the Sanitary Water Board to construct two sewage treatment plants to provide complete treatment and to have them in operation on or before Jan. 1, 1950, Dr. Norris W. Vaux, State Health Secretary and Board Chairman, has announced. This is the first large municipality to receive construction orders from the board under the state-wide clean streams drive which is being advanced with increasing tempo.

Maj. Gen. Philip B. Fleming, Federal Works Administrator, has notified the Hampton Roads Sanitation District Commission in Norfolk, Va., of the completion of the Federal Works Agency's portion of the $16,000,000 sanitary sewer project in the Hampton Roads area. It included 72 miles of sewer lines and force mains, 17 pumping stations and a treatment plant, and was started as a war public works project for Norfolk, Portsmouth, Newport News and the surrounding area.

## Plan new express highway in Pennsylvania

Work on the express highway connecting Harrisburg and York, Pa., and Baltimore, Md., is expected to get under way early next year, according to E. L. Schmidt, chief engineer of the Pennsylvania Department of Highways.

Maryland plans to start work on its section of the new road during 1948.

Present plans, Chief Engineer Schmidt said, call for a 4-lane highway. Grades will not be over five per cent at highest points and will average about two and one-half per cent.

Total cost to Pennsylvania was estimated at $12,500,000. This does not include costs within the city of York, where a bridge over Codorus Creek and a viaduct over the Pennsylvania Railroad yards will have to be erected.

## Cross-Kentucky turnpike proposed as toll road

A bill before the Kentucky legislature calls for building a super north-south highway, to cost around $40,000,000, financed through bonds, and paid off from tolls and concessions. To be known as the Kentucky Turnpike, it would be under supervision of the Kentucky Highway Commission and built in the form of a Y, with one point reaching Louisville, the other going to Cincinnati, Ohio, and Covington, Ky., while the far end would run to the Tennessee line near Knoxville and Chattanooga. Cost would be about $150,000 a mile.

## State road inquiry ordered in Illinois

The Illinois Commission on Highway and Traffic Problems has directed the state highway department to prepare plans for the most extensive investigation of the state's roads undertaken in nearly 20 years.

The commission ordered the highway department to prepare a contract covering the survey for approval by the Public Roads Administration which is empowered to pay half the cost of any investigation meeting PRA's standards. No estimate of the expense for Illinois has been prepared, but similar surveys in other states have cost from $50,000 to $100,000.

The commission voted to interview at its next meeting, set for Feb. 2, representatives of engineering companies qualified to do the job. It is expected that the work will require about a year.

## Narragansett Bay bridge projects to be pushed

Two Narragansett Bay bridge projects are now up for authorization by the present session of the Rhode Island General Assembly. One of the proposed bridges would span the upper end of the bay from Field's Point in East Providence, and the other would cross the east passage extending from Jamestown Island to Newport.

A bridge across the upper end of the bay has been discussed for many years. It would permit through traffic to bypass the downtown section of Providence. G. H. Walker & Co., investment bankers of Providence, New York and St. Louis, is promoting the venture as a privately-financed project to be paid for out of tolls. Its over-water span would be about a half-mile long.

The proposed bridge across the east passage would be a much longer structure — nearly two miles — and would supplant an existing ferry line.

The island of Jamestown is now connected with the west side of the bay by the Jamestown bridge completed in 1940 at a cost of $2,900,000. This is the longest bridge in New England—6,982 ft.

## Name three engineers for S. F. Bay crossings

Soon after the California Department of Public Works announced that a Division of San Francisco Bay Toll Crossings had been set up as the agency to conduct nearly $1,000,000 worth of survey and engineering work on a second crossing, Ralph Tudor, new chief engineer of the division. (*ENR* Jan. 8, vol. p. 29) revealed three appointments to his staff.

Norman C. Raab, supervising bridge engineer in the bridge department of the division of highways, was named design engineer for the new group.

Edwin C. Levy, associate bridge engineer on the present span, will be office manager, and Robert Bosso, will be in charge of surveys.

Yet to be chosen is an assistant to Tudor and a design engineer, tunnels.

## Plan $2 million airport program for Minnesota

Minnesota will spend about $2,000,000 during 1948 on airport developments, including improvements to the fields at Duluth, Winona and Rochester, according to the State Department of Aeronautics.

Airports located in 23 other communities will be completed this year.

## C & O to spend $2 million on Toledo yard work

The Chesapeake & Ohio Railroad has announced it is spending nearly $2,000,000 on improvements at its Presque Isle docks at Walbridge yards, Toledo, Ohio, to speed up the handling of coal and ore cars, and loading and unloading lake vessels.

A somewhat similar development, an $18,500,000 project of the Toledo Lake-Front Dock and Railroad Terminal Co.—has just been completed in the same city.

Scheduled for completion by June 1 is the modernization of the west-bound hump and classification yard at Walbridge at an estimated cost of $1,320,270, to change the yard from a gravity operation to an automatic car-retarder basis.

## J. A. Jones retires as head of construction company

J. A. Jones, who founded the J. A. Jones Construction Co. of Charlotte, N. C., 54 years ago, has now resigned as president to become chairman of the board of directors. His son, Edwin L. Jones, will succeed him as president. Two other sons are officers of the company—Raymond A. Jones, executive vice-president, and Paul S. Jones, secretary.

Other officers elected include: E. J. Kratt, vice-president; H. V. Appen, vice-president in charge of the Wolf Creek Dam project in Kentucky; J. P. Caldwell, vice-president and chief estimator.

## Phoenix fails to get Horseshoe Dam water

Application by Phoenix, Ariz., to install floodgates at Horseshoe Dam on the Verde River and obtain 25,000 acre-ft. of water for domestic purposes has been defaulted, according to O. C. Williams, Arizona state land and water commissioner. (*ENR* Oct. 23, 1947, vol. p. 568).

Williams said failure of the city to effect an agreement with the Department of the Interior, owner of the dam, within a 60-day period following recent hearings now have made it necessary for the city to file a new application to revive the matter.

Horseshoe Dam was designed as a 300,000-acre-ft. reservoir, but its present height limits capacity to 60,000 acre ft. Phoenix proposed to construct floodgates adding 75,000 acre-ft. to the storage capacity, drawing about 25,000 acre-ft. for domestic consumption.

# ASCE hears details of Panama plan

(*Continued from page one*)

rface drainage by dams on the tributry streams connected to the ocean by ng diversion channels. These dams ould cut off 65 percent of Gatun Lake, that only one-third of this great body water would be involved in the final watering operation.

Once a sea-level canal is built, it nnot be destroyed even by the largst guided missles or atomic bombs. lockages could occur for up to two eeks, but these would readily be reoved—by shielded dredges and other uipment in case they are radioactive.

To build such a canal will require 8,000 man years. A 7,500 man labor rce would be expanded to 41,000 in e peak years. All of the common labor ould be local. About 15,000 skilled rkers would come from the U. S.

The great amount of data presented the various special papers is too voluminous even for adequate abstract. ending its publication in *Proceedings* aders of this journal are referred to e 16-page report on the studies which ppeared in *Engineering News-Record* ay 1, 1947, vol. p. 739. For present urposes only a few of the many sigificant discussions at the A.S.C.E. eeting can be presented here.

Brig. Gen. Hans Kramer, (retired) a ember of the consulting board, ointed out, as did most of the Panama anal engineers, two basic requirements that governed the students (1) to se extreme conservation in handling ll design questions to the end that estiates would be realistically high; and 2) to treat the hypothetical project s though it were actual down to the oint of selecting actual construction ethods and even construction machinry. In the latter connection General Kramer emphasized, however, that conractors would be expected, in fact, rged to develop their own methods of ttack, when and if the project is built.

Members of the Special Engineering Division who presented papers included W. V. Binger, chief, soils and geology branch; J. J. Rose, chief, construction planning branch; L. T. Crook, chief, estimating section; F. Stewart Brown, chief, general engineering branch; J. Stewart Meyers, chief, hydraulic section; Col. Ellsworth Davis, executive officer; and J. E. Reeves, chief of the division. Consultants and contractors on the studies who gave papers included Prof. Arthur Casagrande, Harvard University; M. J. Woodhull, Bucyrus-Erie Co., Milwaukee, Wis.; and C. M. Romanovich, Yuba Manufacturing Co., San Francisco, Calif.

Tidal control and earth slopes were the design factors receiving most attention. Maximum uncontrolled tidal currents, as determined on a 1:100 undistorted model, would be about 4½ knots. Since modern ships can operate through such currents, there were some, including members of the consulting board, who felt regulation was not necessary, but in the interest of safety and ease of operation the tidal current control structures were included at a cost of 7 percent of the total. They are of a type that could readily be removed in case of damage in wartime, permitting the canal to operate as an uncontrolled waterway.

The bank slope problem was approached both in the light of our new knowledge of soil mechanics and of what experience has shown in building and maintaining the present canal. Thus instead of a single 3:2 slope, such as the early builders tried to establish, a safe slope has been determined for each of the many geologic formations encountered. The Cucarucha clay, the most treacherous of all, was given special attention. Laboratory testing being difficult on this very weak material, an analytical study was made of an existing stable bank. From this, slopes of 1:4.6 to 1:9.4 depending upon depth of cut, were chosen for this material. All excavation will be carried to stable slopes initially, instead of waiting for slides. All basalt and agglomerate overlying Cucaracha will also thus be cut off. Stable slopes are considered to be those having a factor of safety of 1.3, although several discussors thought this could be reduced to 1.0 and save considerable excavation.

The question of bomb damage to canal banks, originally a serious consideration, was shown by dynamic loading tests at Harvard to be of only minor importance. "Transient" forces caused by explosions will not induce slides in statically stable slopes, it was concluded. Earthquakes, likewise, need not cause concern.

As to construction, the decision to go to unprecedented sizes of equipment was deemed justified on the basis of speed of construction. A resulting saving of 9,000 men on the labor force can also be translated into a substantial money saving. Dredging 145 ft. under water was the greatest problem to be solved, but equipment companies, as a part of the studies, have designed machines that they are certain can operate successfully. The chain bucket dredge with 2 cu. yd. buckets would have a chain or ladder 200 ft. long. The hydraulic dredge would have a 46-in. suction and a 40-in. discharge. Dipper dredges will be used only to 90 ft., although the manufacturer claims he can design such a dredge for 145 ft. digging.

Contractors would be aided by the government in the financing of any such special equipment as the above.

Although 310 million yards of material must be dug below water, only 12 percent is classified as hard, and it is believed that only 3 percent is so hard as to require drilling and blasting.

Dry excavation would be handled in several ways, depending upon the elevation above the lake at El. 85. Above El. 270, for the very deep cuts, conventional equipment would be used, with disposal by truck. From El. 90 to El. 270 the large 25- to 35-yd. shovels would be used, with disposal by scows operating in dredged channels.

A face 90-ft. high can be worked with the big shovels. Up to El. 180 they will discharge directly to the scows while above that elevation the excavated material will have to be recast. In widening and deepening cuts below El. 90 down to the bottom of the sea level canal at El.—60 draglines will be used.

# ASCE divisional meeting discussions

Adherents of federal control of stream pollution found small comfort in the sessions of the Sanitary Engineering Division, in which a major part of the program was devoted to recitals of successful results achieved by means of state and regional agencies created through voluntary compacts. In fact, little opportunity was lost in decrying the extension of federal control, the most vociferous spokesman in this regard being James H. Allen, executive secretary, Interstate Commission of the Delaware River Basin, (Incodel)

In contrast to Incodel, which is a voluntary compact group representing New York, New Jersey, Pennsylvania and Delaware for the development and conservation of natural resources in the Delaware River Basin, Mr. Allen picks the Tennessee Valley Authority as the target for his attack. He cited TVA as an agency that operates on the theory that the federal government has final authority on natural resources.

"Incodel believes this is a false and dangerous premise. If expanded to its ultimate conclusion—and movements have been afoot for the last ten years to

(*Continued on following pages*)

do just that by blanketing the entire United States with similarly constituted federally-controlled authorities—eventually it would result in the end of our system of self-government as we have known and practiced it since the thirteen original colonies ratified the constitution creating the United States of America."

Admitting that the federal government does have an interest and stake in conservation of natural resources, Mr. Allen contended that such measures are primarily the responsibility of local state government and of the people of the affected regions. Such problems, he said, must be approached on the basis of a partnership in which all interests participate in a fully cooperative manner.

Although a following paper dealt with operations of the TVA stream pollution abatement and probably was prepared without knowledge of what Mr. Allen was going to say, in part it could have been construed as a defense of the TVA philosophy. The speaker, Robert N. Clark, chief public health engineer of the TVA said: "Since the ultimate success of a regional program of resources development by a single governmental agency, depends so largely upon the expansion and success of regional institutions and agencies., the greatest successes will result from a policy of leadership and collaboration, coupled with a willingness and desire by the governmental agencies to withdraw from active participation in each element of the program as rapidly as local resources can assume responsibilities with a fair prospect of success."

It is such a policy, says Mr. Clark, to which the TVA is committed in many phases of its program of resources development.

### *Progress in New England*

In the opinion of Warren J. Scott, director of the Connecticut Bureau of Sanitary Engineering, the most effective progress in interstate stream pollution control will be made through joint legislative agreements among states.

He described the steps leading to the formation of the New England interstate water pollution control compact, ratification of which was voted by Congress on July 23 and which has already been subscribed to by Connecticut, Massachusetts and Rhode Island. Said Mr. Scott: "The banding together of the interested states to make progress in improving the condition of interstate streams and, at the same time, to protect the interest of the states without federal dictation is an important reason for the compact. At the same time, it is recognized that the country as a whole is concerned with the general problem of water conservation, and if federal legislation is enacted, the compact group could well represent the area in any cooperative approach.

It is expected, continued Mr. Scott, that the legislatures of Maine, New Hampshire and Vermont will accept the compact when they next go into session. Provision is also made for the participation of New York State, some of whose waterways are common to the New England region.

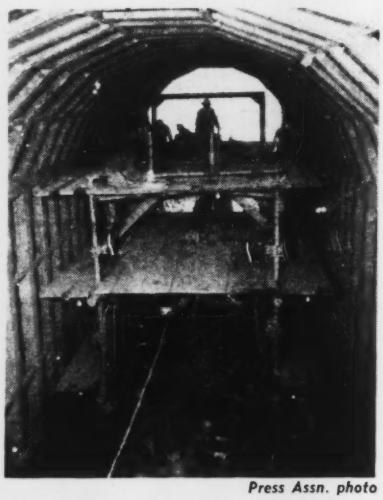
The commission will establish reasonable physical, chemical and bacteriological standards of water quality satisfactory for various classifications of use. Each state agrees to submit its classifications of its own water to the commission for approval. The first major task of the commission will be to establish standards for various classifications.

Each state pledges to provide for abatement of existing pollution and control of future pollution of interstate waters, although the commission itself has no power to issue court orders. Success of the compacts, therefore, will rest largely on the cooperation and support of the participating states.

A system for classification of waters has already been agreed upon, based on stream use. This was outlined by Arthur D. Weston, director and chief engineer of the Massachusetts Department of Public Health, who pointed out that although this classification carried no legal significance, it probably will have considerable weight in determinations to be made by the states which are bound under the compact.

The Interstate Sanitation Commission (having to do with waters adjacent to New York, New Jersey and Connecticut), establishes definite chemical, bacteriological and physical standards that must be met before sewers or other polluting material may be discharged, and it is not necessary to prove the existence of a health menace for the commission to take action, reported Seth G. Hess, director and chief engineer.

If a municipality fails to conform to orders of the commission, the commission may institute court action in its own name to compel compliance. In this respect, the Interstate Sanitation Commission differs markedly from most other interstate pollution abatement agencies. However, said Mr. Hess, the commission has used its powers only to strengthen and supplement the authority of its signatory state agencies, and in its twelve years of operation has been forced to resort to legal action in only two cases.



Press Assn. photo

***Railroad Tunnel—Driving of a 6-700 ft. tunnel through the Uintah Mountains at Aspen, Wyo., is well advanced, under direction of the Morrison-Knudsen Co., Inc., contractors. Built for the Union Pacific Railroad, the $8,000,000 improvement will speed up railroad traffic over the high mountains.***

### *Opposed to federal grants*

The Committee on Sewerage and Sewage Treatment of the Sanitary Engineering Division, under the leadership of Langdon Pearse, sanitary engineer of the Chicago Sanitary District, added its authoritative voice to the rejection of federal stream pollution legislation introduced in 1947 and now pending before the Congress.

Said the report: "In the opinion of the committee, any federal legislation should be limited to control of pollution of interstate streams (where the states have not acted) and should be devoid of any authorization of loans or grants in aid for planning or construction of work."

### *Treatment tailored to tidal flow*

Oscillating tidal flows in the East River between Throgg's Neck on Long Island Sound and the Battery prevent transportation of sewage sediment which, decomposing anaerobically, places a heavy load on overlying water that accounts for at least 25 percent of the summer oxygen demand. This is one of many estuarial conditions that must be considered in planning treatment works for cities located on rivers and the sea coast said Richard H. Gould, director, division of engineering and architecture, New York City Department of Public Works.

New York's overall disposal program, reported Mr. Gould, endeavors to make the best use of tidal conditions by employing four types of treatment. In areas where fullest protection is required, such as places of recreation, the activated-sludge process is used. At the

other end of the scale, sedimentation with or without chlorination is adopted. Depending upon the natural conditions and degree of purification required, graduated processes between these extremes are employed.

As a measure of progress it was reported that $68,000,000 has been spent thus far on disposal facilities in New York. To complete the program at present prices at least another $134,000,000 would be required.

## Power Division

Trends in the cost of building and operating steam and hydro-electric plants were discussed at the first session of the Power Division meetings, the discussion being centered around two papers, one on steam-electric power costs by Edwin H. Krieg, chief design engineer of the American Gas and Electric Service Corp., New York, and one on hydro power costs by Milton G. Salzman, hydraulic engineer, Ebasco Services, Inc.

Basing his conclusions in large part on what happened after World War I and the Civil War, Mr. Krieg expressed the view that construction costs are near a peak now and will level off at about 60 percent above prewar costs. Plant costs for his company are up 63 percent above 1940. Equipment costs have gone up 50 percent and the cost of structures is up 90 percent. Engineers can offset some of the effect of rising costs by economies in design such as the elimination of costly housing required for fully enclosed stations.

Labor now makes up 40 percent of the total cost of a hydro station, exclusive of land, according to Mr. Salzman. He noted that part of this is due to the lower productivity of labor, which is about 36 percent below prewar, according to the 14 city study conducted by *Engineering News-Record*.

Mr. Salzman cited the following as ways in which the cost of hydro-electric power can be reduced: Use larger units and higher unit speeds; develop a continuing construction program; design for outdoor stations; use less special equipment; eliminate operators villages as far as possible; design for remote control where possible; and use improved construction methods and equipment.

Mr. Krieg's prediction of a leveling off of construction costs was questioned by W. F. Ryan of Stone & Webster Engineering Corp. in a written discussion presented by G. R. Strandberg of the same firm. Mr. Ryan thinks this is improbable in the light of current government policies and the lower productivity of labor. Like views were expressed later in the session by F. W. Scheidenhelm, consulting engineer, New York.

Mr. Strandberg said that some reduction in hydro costs can be made by using higher pours in the construction of concrete dams, up to 50 ft. as is now being done by the Ontario Hydro, by simplification of gate designs and by elimination of super-structures over the units.

The second session of the power division was given over to consideration of papers on Nantahala hydro-electric project in North Carolina by James P. Gowdon, chief engineer of the Aluminum Company, and D. J. Bleifuss, engineer of the International Engineering Co.; also an account of the rehabilitation of Barker Dam in Colorado by Prof. Raymond E. Davis of the University of California.

### High rock-fill dam

Nantahala Dam, built in 1941, is one of the largest earth-faced rock dams ever built, utilizing some 2,000,000 cu. yd. of rock and 260,000 cu. yd. of earth to make a dam 250 ft. high and 1,080 ft. long at its crest. The dam was constructed by dumping rock in two major lifts, the first 135 high, then placing smaller rock to serve as a filter, followed by compacting an impervious earth core from 29 to 13 ft. thick and covering with rock for protection. Hydraulic sluices were used as the rock was dumped, to assist in compaction by lubricating the stones and washing in small pieces. Four times as much water was used as the volume of rock placed.

Since the dam was finished in 1942 the reservoir has been filled and emptied every year. The dam has settled a total of 2.16 ft. vertically and its top at the center has moved downstream 1.01 ft. Movement in the last year was 0.19 ft. vertically and 0.10 ft. downstream. Seepage is 2 cu. ft. per min.

## Highway Division

Constructive suggestions for integrating toll highways into the nation's road system were presented in a toll-roads session of the Highway Division. Toll roads, for purposes of discussion, were defined by Charles M. Upham, chairman, as a road on which all users are charged a toll, which in addition to covering operating cost is intended to liquidate the bond issue to cover initial cost.

Enoch R. Needles, of the consulting firm of Howard, Needles, Tammen and Bergendoff, presented the case for toll roads but advocated them only where seriously needed facilities could not otherwise be obtained. The Maine Turnpike, for example, would have required all available state and federal-aid highway construction funds of Maine for four years. Fifty-miles long, the turnpike was built in two years by The Maine Turnpike Authority, using $20,000,000 borrowed on the security of toll returns alone. Opened in mid-December, its use and toll return have been gratifying.

Mr. Needles proposed that the Public Roads Administration supervise planning of proposed toll highways to make them fit into the existing system, using the following criteria: Each proposed toll highway would have to be shown clearly unattainable otherwise; each would conform to national and state plans for major routes; and each would meet approved standards as to design, plan, materials and construction as well as standards of practicability, need and financial soundness.

### An escape mechanism

Toll roads are an escape mechanism to cover the failure of highway authorities, said H. S. Fairbank, deputy commissioner of the Public Roads Administration, as he pointed out the unfavorable aspects of toll facilities. Anything less than full freedom of travel with every road a free link in a full chain of highways is deplorable; a toll road does not fully serve due to access restrictions; it is inequitable to collect on a section of highway; new roads built as toll highways become just that much more mileage to be maintained when they are "given" to the state after bonds have been retired; toll roads generate traffic that has to be taken care of at the ends of the road; only 12 to 20 percent of trips are long enough to take advantage of toll roads; toll collections sometimes are retaliatory or show evidence of crass provincialism.

If a highway facility is needed, the states should borrow and build now, Mr. Fairbank said. The real need is serving the super volume of traffic rather than providing super-service for a few.

Other points of interest came out in the panel discussion. Toll collection on the Merritt Parkway in Connecticut cost $150,000 while maintenance costs $160,000. Annual take is $1,000,000 with the net proceeds going to construct the Wilbur Cross Parkway, an extension of the Merritt Parkway.

Gross take on the Pennsylvania Turnpike last year was $5,000,000. Original figures indicated that it would reach $1,600,000 gross take by 1960. Hence the road was in excellent shape to refund its 3¾ percent Reconstruction Finance Corporation bonds at a new rate of 2½ percent.

All of the panel favored the free system of roads if money could be obtained for the construction.

(*Continued on following page*)

## Soil Mechanics and Air Transport

The effect of heavy wheel loads on airport pavement was outlined by Robert R. Philippe of the Ohio River Division Laboratories of the Corps of Engineers at a joint meeting of the soil mechanics and air transport divisions. At Lockbourne Army air base, sand and loose gravel bases proved of less value than no base at all, but compacted crushed stone was better under 6 in. slabs. For 8-in. slabs, base courses 6 to 12 in. thick were helpful but less valuable than wire mesh at the slab top. For 10-in. concrete slab, little difference existed between bases and no bases under heavy loading.

Reinforcing in the concrete slabs was good but probably uneconomical. Truss slabs of thick concrete with steel at the top and bottom may prove to be good for future heavy loading.

Commenting on experiences with joints, Mr. Philippe said that free joints never should be used. Keyed joints are objectionable as the top frequently breaks off on the grooved side. Load transfer devices seem to be helpful unless they require a key. An 8,000 ft. long, 21 in. thick runway built without joints has proved entirely satisfactory.

Investigation at the same field showed that non-rigid materials were better than concrete for overlay repairs to existing concrete pavement. Even 3 in. of asphaltic concrete gave large structural benefit to an old concrete slab.

#### Sand drains

O. J. Porter, consulting engineer, Sacramento, Calif. told about installations of vertical sand drains in soft material where draining the material had been found to be much more economical than removing it to stabilize large areas for construction.

On a job in Connecticut, sand drains were installed at a cost of $5,000 where it had been estimated to cost $100,000 to excavate and replace material 25 ft. deep across a length of 1,000 ft. for a highway fill. Settlement of 3½ ft. was reached in a few weeks with a total of nearly 5 ft. permitting paving within a year. Cost of installation of the drains was 40c per lin. ft.

## City Planning

It is not unreasonable to anticipate that cities will lose 30 to 40 percent of their population within the next two or three decades, Mabel L. Walker, executive director of the Tax Institute, Inc., New York City, told the City Planning Division.

In a convincing analysis of the forces that are pulling population away from urban centers, and which are likely to be great enough to produce a fundamental change in the character of the American city, Miss Walker cited the following:

1. Most importantly, the individual urge to live outside the city.

2. Ever-increasing mobility made possible by improved transportation facilities. These improvements implement the desire of the citizen to escape from the city.

3. An accelerated trend to decentralization of industry. Reflecting deliberate policy on the part of industrial leaders, recent statistics show how far this decentralization has already proceeded. Since 1940 the percentage of new plants located in cities under 10,000 has gone up sharply; the percentage of plants in cities of 10,000 to 100,000 has also increased, but to a lesser extent; but the percentage of new plants in cities over 100,000 has decreased very sharply.

4. Development of increasing amenities of country life, represented in particular by such things as improved highways and rural electrification.

5. Increasing importance of mercantile decentralization.

6. Military decentralization, contributing to some extent to the breaking up of congested industrial and residential areas; and

7. Decentralization resulting from the use of atomic energy for fuel, which may not be far distant.

Looking toward the future characteristics of the city after it has gone through the current metamorphosis, Miss Walker envisions the following: It will be large in area. It will be less congested. It will have more transportation facilities. It will have spacious public buildings and plazas. It will have shopping centers, art, educational, recreational and religious centers. It will have more parks and parkways.

#### What we are facing

"We are faced with two alternatives. We can adjust our cities to the needs and demands of a fluid population or we can ignore the situation or take ineffective small measures to meet it, and thereby make things uncomfortable for everybody — ourselves included — for decades to come. This readjustment will constitute urban reconversion, which is a far larger thing than urban development.

The problem of urban reconversion is so complex that no one group of experts can hope to deal with it alone. In making plans for the future, concluded Miss Walker, we must be extremely careful, however, to realize that we are attempting to plan the city for the people and not the people for the city.

#### Rehabilitation is slow

Reviewing developments in New York City, Robert F. Wagner, Jr., chairman of the City Planning Commission reported that rehabilitation of blighted areas by private and institutional investment has not reached the level originally anticipated. In the 20 years since enactment of the state limited-dividend housing act, only ten projects have been constructed, containing 5,822 apartments. Under the urban redevelopment companies act, seven developments under construction, will upon completion, provide housing for 13,851 families.

Leslie Williams, city planning engineer of the American Transit Association, summarized the present situation of city planning activities as follows:

"Just as we cannot cure traffic congestion by chasing automobiles from one thoroughfare to another with a bunch of "No Parking" signs in one hand and a bundle of parking tags in the other, neither can we cure population congestion or urban blight by knocking down 5 or 6-story brick tenements and then piling more bricks into new but higher piles on the same lots whether done by public or private action or both".

## Board Action

William N. Carey, executive secretary of the society, advised the Board of Direction at its meeting held Jan. 19-20 that 25 sections had asked the board to reopen the subject of an increase in dues. At the Jacksonville meeting last fall, as a result of failure of the constitutional amendment calling for an increase to receive the necessary two-thirds vote, the board had decided to abandon efforts to increase the society's income from dues. Instead, it made drastic cuts in the society's expenditures, including a large cut in the amounts contributed to the local sections.

As several of the sections made new proposals for amending the constitution to increase the dues, the board decided to recommend to the sections for their consideration two proposals that had come from the Tennessee Valley Section in the hope of obtaining uniformity in the petition for a change in the constitution that might come to the board. These proposals are as follows:

1. An increase of $5 in the dues for members, associate members and affiliates, and an increase of $2.50 in dues for juniors.

2. Set the dues for members in Dis-

trict No. 1 at the same figures as those in other districts. (They now are $5 higher).

Putting the subject before the members in this form will give members an opportunity to vote separately on the controversial question of continuing higher dues in the New York area (District 1), which was not possible on last years ballot.

#### Budget balanced

Regardless of whether or not the subject of increased dues is voted on again this year, the board voted to keep the society's expenditures within its income even if further curtailment of activities was involved.

As one way of reducing expenditures, the board took under consideration a proposal to reduce the number of society meetings from four to three a year. Also under study is a plan to change the date of the annual meeting in New York to October when weather conditions are better in that city.

The spring meeting of the society is to be held in Pittsburgh in April this year, the summer meeting in Seattle in July and the fall meeting in Boston in October.

#### Engineering congress

Civil engineers were urged by William K. Batt, president of SKF Industries, Inc., to seek opportunities for making useful contributions to the success of the Marshall Plan. Speaking at the luncheon on Wednesday, Mr. Batt said that Europe desperately needs American engineering skill and know-how as well as American capital. As a means for making some of this available he recommended that heads of industries lend some of their engineers and production experts to the administrators of the European Recovery Program, continuing to pay their salaries. He was confident, he added, that the indirect return would exceed the actual cash outlay, and in addition, the loaned engineers would come back better men.

## Structural Division

The possibility of achieving greater economy in the design of steel beams through continuity was explored before the Structural Division by Prof. Bruce G. Johnson, associate director of the Fritz Engineering Laboratory, Lehigh University, and Robert A. Hechtman, research engineer in civil engineering, University of Illinois. In "Design Criteria for Beams with Semi-Rigid Connections," a simple design method, based on test results (*ENR* Oct. 10, 1940, vol. p. 484), was presented for the smaller size beams with riveted or bolted connections.

# Sewage chlorination studies reveal inadequate dosage-flow relationship

***N. Y. State Sewage Works Association told how statistical methods may be applied to govern number of coliform bacteria in sewage effluents at annual meeting***

"What expedient yardstick can be used to ascertain whether the desired kill has been achieved in a chlorinated sewage?" This question provided the basis for a study of a statistical approach to the chlorination of sewage, the results of which were reported by Rolf Eliassen, professor of sanitary engineering, New York University, in a paper jointly authored with Austin N. Heller and Herman L. Krieger, research associates, at the annual meeting of the N. Y. State Sewage Works Association in New York City last week.

Mixing of chlorine and sewage is essential to obtain the greatest kill of coliform bacteria. The need for rapid mixing to create sufficient turbulence for complete dispersion of chlorine through sewage, Prof. Eliassen stated, is significant. Either mechanical or hydraulic devices may be used with equal success.

Based on a stipulated coliform index of 300 per 100 milliliter for 50 percent of the time, experiments on one type of sewage demonstrated that it would have to be dosed to about 140 percent of the chlorine demand with initial mixing. With no mixing, the dosage would approach 190 to 200 percent of the demand. Thus, a considerable saving in chlorine cost could be effected by use of initial dispersion of the chlorine in sewage.

In addition, it was found that the Most Probable Number (MPN) of coliforms in the sewage after ten-minute-contact chlorination could not be related to the chlorine dosage. Prof. Eliassen declared that arbitrary dosage, proportioned only to flow, is not a reliable method of achieving a specified MPN of coliform bacteria in sewage effluent.

To apply the laboratory method to plant-scale operation, he outlined a suggested procedure, based bacterial and chlorine-residual analyses of samples collected on ten separate days.

#### Step aeration handles heavy loads

With loadings of 54 to 84 lb. of biochemical oxygen demand per 1,000 cu. ft. of aerator per day (two to three times normal) and one-half the sewage flow in contact with activated sludge for 35 min., stepped aeration removes 90 percent of BOD applied to the secondary system when primary effluent additions are made to the third and fourth passes of the aeration tank. This was one of the results obtained at New York's Bowery Bay plant during a seven-month trial reported by William W. Torpey, Civil engineer, Department of Public Works, who described the process in which 40 mgd. were handled with 2½ hr. detention in aeration tanks.

During the trial, primary effluent was added either to the second and third passes (in anticipation of shock loadings) or to the third and fourth channels of the aeration tanks to develop a sludge with an "age" of 3.5 days. Mr. Torpey defined "sludge age" as the average number of days suspended solids remain under aeration from the time they first enter the secondary system, until they leave.

Effective use of air was indicated especially in the final test period when on the average a pound of BOD was removed with 490 cu. ft. of air, Mr. Torpey said. This compares favorably with the 1,000 cu. ft. figure, often used in design.

He also said that by changing the mode of adding primary effluent to various passes of the aerator, flexibility of operation in handling high loads was provided.

#### Awards presented

The Lewis V. Carpenter Memorial award for the best report on plant operation submitted during 1947 in New York state was presented to Henry M. Rath, superintendent of the New York's Tallman's Island plant.

The 1947 Kenneth Allen award for the most meritorious paper of research and technical nature went to C. J. Velz, professor of sanitary engineering, Manhattan College, for his study "Factors Influencing Self-Purification of Streams and Their Relations to Pollution Abatement."

The Triennial Kenneth Allen Prize, given by the Federation of Sewage Works Associations, was presented to Wellington Donaldson, chief, Bureau of Sewage Disposal, Department of Public Works, New York City, by George E. Russell, president of the Federation.

Edwin C. McKeeman, Freeport, N. Y., and Paul E. Pardet, New York City, were elected president and vice-president, respectively. A. F. Dappert and J. C. Brigham were re-elected secretary-treasurer and assistant secretary-treasurer.

### LABOR ROUNDUP

Associated General Contractors of *Fort Worth, Tex.*, have agreed to pay union carpenters $1.87½ an hour, an increase of 12½ cents an hour . . . Most *Honolulu* construction workers are getting raises of 10 and 15 cents an hr. . . . Two additional AFL construction trades unions have submitted to the Master Builders Association of *St. Louis, Mo.*, demands for wage increases, both to become effective on May 1. The Bridge & Structural Iron Workers Union is seeking a raise of 25 cents per hour from the current rate of $2.25. The Cement Finishers Union is asking a raise of 35 cents an hour from the current rate of $2.15. . . . A new plumbers wage rate of $19 a day and $38 a day for overtime "has caused a partial shutdown and slowdown of construction in the *Sabine, Tex.*, area," according to a statement by the area construction committee, representing all general contractor groups . . . . Wage agreements have been reached in four of the five building trades crafts in *Delaware* whose contracts expired at the end of last month. Increases have settled the wage issue for bricklayers, carpenters, plumbers and electricians, but the request of the common laborers, seeking a 20-cent increase, has been submitted to arbitration. . . . Members of the Painters' Union at *Everett, Wash.*, voted to hold in abeyance a 14-cent-an-hour wage increase and further voluntarily cut their pay scale 2½ cents an hour. Contractors of the city announced they would pass this saving on to their customers. Carpenters in *Mount Vernon, Wash.*, refused a scheduled wage increase a year ago but accepted it when the contract was renewed recently. And at *Ellensberg*, the Construction Laborers' Union reached an agreement with the Kittitas County Associated Contractors calling for a 15-cent-an-hour increase.

## Plan pollution survey of Utah Lake

As the first step in a master program to combat a serious pollution problem in Utah Lake, 32 city and county officials from Utah county recently voted to have an engineering survey made of the type and degree of sewage treatment needed by all major cities in the county.

The report will be used as a guide for sewage treatment development so individual city facilities will fit into an overall county pattern.

Sewage from five major cities and other smaller localities now flows into the lake, creating a serious handicap to recreational development.

## Building trades wages up 52 percent since 1939

Union wage rates in the building trades have increased 52 percent since 1939, four-fifths of the increase occuring since V-J day, it is reported by the U. S. Bureau of Labor Statistics in its quarterly report covering seven crafts in 75 cities.

Almost 135,000, or more than one-fourth, of the 500,000 union tradesmen in the 75 cities received wage increases in the last six months of 1947. This increased the average for all union workers by three percent, from $1.91 to $1.96 an hour.

Hourly wage increases ranged from 2½ cents to 56 cents, but 40 percent of the workers whose payscales were boosted got from 25 to 30 cents, and 26 percent got from 10 to 15 cents.

The table below shows the estimated increase between July 1, 1947, and Jan. 2, in each of the seven crafts when averaged over all the union workers in these trades in the 75 cities. It also shows the low and high union rate and the average existing on Jan. 2.

| | Estimated Increase (cents per hour) | Rate Level Low | High | Average |
|---|---|---|---|---|
| Bricklayers | 3 | $1.75 | $2.81 | $2.40 |
| Carpenters | 6 | 1.50 | 2.75 | 2.06 |
| Electricians | 8 | 1.50 | 2.50 | 2.19 |
| Painters | 8 | 1.25 | 2.30 | 1.99 |
| Plasterers | 6 | 1.75 | 3.00 | 2.33 |
| Plumbers | 2 | 1.50 | 2.81 | 2.22 |
| Building Laborers | 1 | .75 | 1.75 | 1.24 |

## Col. W. G. Atwood dies; R.R. consulting engineer

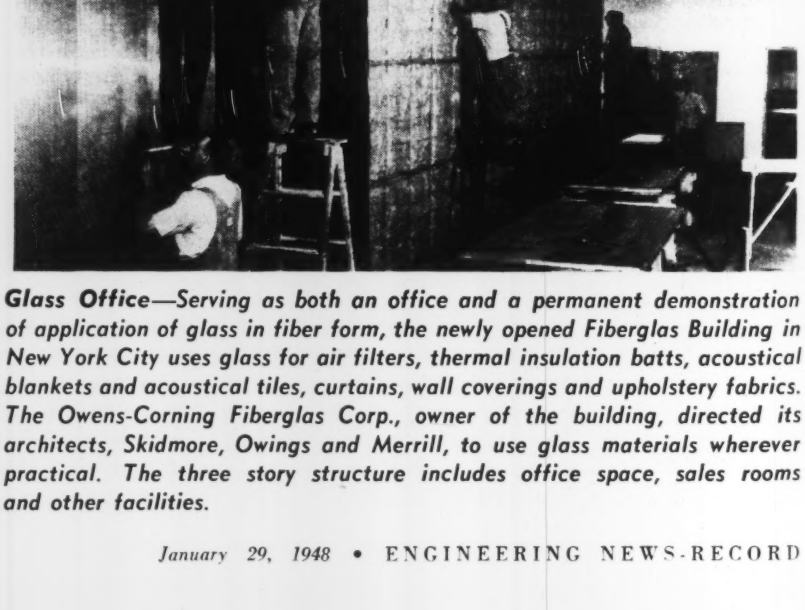
Col. William G. Atwood, 75, for many years a consulting engineer executive and long an expert in railroad engineering work, died at Winter Park, Fla., Jan. 24. He received a civil engineering degree from Cornell University in 1892. During the first world war he commanded the 17th American Engineer (Railway) Section, and had charge of the extensive terminal construction for the AEF at St. Nazaire, France.

After the war he was director of the Division of Communications in Central Europe for the American Relief Administration, under Herbert Hoover, having charge of the re-establishment of railroads.

Colonel Awood's peacetime work included that of U. S. mineral surveyor for Alaska, a locating engineer and assistant engineer of construction for the Alaska Central Railway. Later he was division engineer of the Lake Shore and Michigan Southern Railway, and chief engineer of the Lake Erie and Western Railroad.

In 1919 Colonel Atwood served as United States Transportation representative on the Supreme Economic Council in Paris. He was technical adviser to Yugoslavia in 1920 and a consulting engineer from 1924.

He directed the Marine Piling Investigation for the National Research Council and was the author of "Marine Structures, Their Deterioration and Preservation."



***Glass Office**—Serving as both an office and a permanent demonstration of application of glass in fiber form, the newly opened Fiberglas Building in New York City uses glass for air filters, thermal insulation batts, acoustical blankets and acoustical tiles, curtains, wall coverings and upholstery fabrics. The Owens-Corning Fiberglas Corp., owner of the building, directed its architects, Skidmore, Owings and Merrill, to use glass materials wherever practical. The three story structure includes office space, sales rooms and other facilities.*

# Aid for civil hospitals OK'd by USPHS

More than 90 applications calling for at least $13,000,000 federal-aid for funds for construction of civilian hospitals and health centers have been approved by the U. S. Public Health service as part of its $1.1 billion program for civilians. Including matching funds, the projects approved will cost more than $40,000,000, thus a start has been made on the extensive construction approved by Congress in 1946 (*ENR* Sept. 26, 1946, vol. p. 412).

In that year Congress appropriated $2,350,000 for detailed surveys and planning and last year it provided $75,000,000 of contract authority to permit construction to be started (*ENR* July 31, 1947, vol. p. 146). It is in view of this authority that the PHS service is now approving construction applications. However, the PHS may soon have actual cash to back up these commitments, as the President in his budget message to Congress Jan. 12 requested $15,000,000 for the present fiscal year and $60,000,000 in cash for next year, plus an additional $75,000,000 of contract authority for fiscal 1949. (*ENR* Jan. 15, 1948, vol. p. 77).

The overall program approved calls for $75,000,000 of federal aid for five years, plus $3,000,000 for detailed plans and surveys. Distribution of the construction aid is based upon a complicated formula taking into consideration both the population of a state and the per capita income of each state. The allotments to the various states of the $75,000,000 of authority under this formula were published in *ENR* Sept. 26, 1946, vol. p. 412.

All projects approved must be part of a state program approved by that state and the surgeon general's office. Federal assistance is limited on any job to one-third the cost of the work.

On Nov. 5 last year the first construction application was approved. At that time use of $552,000 of federal aid for a 82-bed $1,663,000 hospital to be built at Langdale, Ala., was authorized. Now approvals are being made at sufficient rate that about 400 projects calling for $75,000,000 of federal aid are expected to be approved by the end of this fiscal year or June 30.

## Wyoming tries to keep canyon road free of snow

Wyoming's highway department recently decided to tackle its most difficult road maintenance job. It will attempt to keep the Snake River canyon road in the mountainous Teton County open this winter.

J. R. Bromley, state highway superintendent, said the effort to keep the 30-mile stretch of road free of snow will be an experiment to determine if such operations are practicable. If the operation becomes too difficult the plan may be abandoned, he said.

The department will make no effort to keep the Teton Pass road open between Wilson, Wyo., and Victor, Ida., Bromley said. All work will be diverted to the Snake River route until the winter season is over.

## Propose Maine reservoirs to cost $5 million

The Limestone Electric Co. is considering development of a chain of lakes along Fish River in northern Maine because of the prospect of power shortages in Aroostock County.

Dams would be built that would raise the level of Eagle Lake by 12 feet; Square Lake 7.5 feet; Cross Lake 7 feet, and Mud Lake 3.5 feet. The resultant storage would permit raising of capacity of the power plant at Grand Falls, N. B. by a maximum of 70,000 kw. The cost is estimated at about $5,000,000.

## Unregistered practice stopped by Ohio court

Practice of professional engineering by Ray D. Hulslander, doing business as the Aimes Engineering Co., Cleveland, Ohio, was perpetually enjoined by the Court of Common Pleas for Cuyahoga County recently until Mr. Hulslander becomes registered by the Ohio State Board of Registration for Professional Engineers and Land Surveyors.

The court's decision was rendered in an action brought by the Ohio Society of Professional Engineers and William C. Kammerer, past president of that society, as an individaul, against Mr. Hulslander and some of his associates. It was held that they were practicing under the name of the Aimes Engineering Co. and had advertised in a way to indicate that they were professional engineers, although none was registered.

The court found that Mr. Hulslander, individually, doing business as Aimes Engineering Co., had maintained his principal office in the city of Cleveland for the last four years and had "advertised and held himself out individually to the public and as doing business in the name of Aimes Engineering Co. as engaged in the practice of professional engineering" without being registered.

This is the second case in which the Ohio Society of Professional Engineers has succeeded in getting the state court to stop the practice of unregistered engineers and the court ruling was hailed by the society as greatly strengthening its efforts to protect the public against such practice.

Bell Aircraft Corp. photo

***Mechanical Buggy**—Something new in wheelbarrows is in use on the construction of the Veterans Hospital at Buffalo, N. Y., on a contract held by the Ziegfried Construction Co. The machine has a capacity of 1,000 lb. of wet or dry materials, either with a bucket or with a platform deck. The bucket dumps mechanically, and the machine is moved by a 3 hp. gasoline engine. The bucket has a capacity of 10 cu. ft. of material.*

# THE PIPE USERS ANSWE

Based on actual survival and retirement experience, what do we really know about the useful life of water works facilities? That was the $64 question water works men asked themselves. Here is how they came up with the answer.

A committee was formed by 3 water works organizations to direct a survey of the recorded experience of 25 cities, large and small, from Canada to Florida. These cities were selected as comprising a cross-section of various water service conditions. The facts were obtained by and from water works men. The survey has been completed and the findings published by the American Water Works Association.

In the 25 cities surveyed, 50 million feet of cast iron water mains, sizes 6-inch and over, had been laid in the 128 years since 1817. The survey revealed, as the chart opposite shows, that 96% of all cast iron water mains ever laid in these 25 cities, sizes 6-inch and over, *are still in service!* An official record that speaks for itself.

The cast iron pressure pipe industry, in spite of raw material shortages, achieved in 1947 one of the biggest production years in footage in the history of the industry, and has recently installed additional footage capacity.

**Mr. Q-Check says** *Alexandria, Virginia, laid its first cast iron pipe in 1852 and 99% of all sizes laid from that date is still in service.*

*All statements and percentages regarding service records of cast iron mains set forth in this advertisement are based on published reports of a survey directed by a Joint Committee representing the American Water Works Association, New England Water Works Association, and the Institute of Water Supply Utilities. The findings, as they apply to cast iron pipe, have been reprinted by permission in our brochure "Survival and Retirement Experience with Cast Iron Water Mains." If you have not received a copy, write to Cast Iron Pipe Research Association, Thomas F. Wolfe, Engineer, 122 South Michigan Avenue, Chicago 3, Illinois.*

CAST IRON

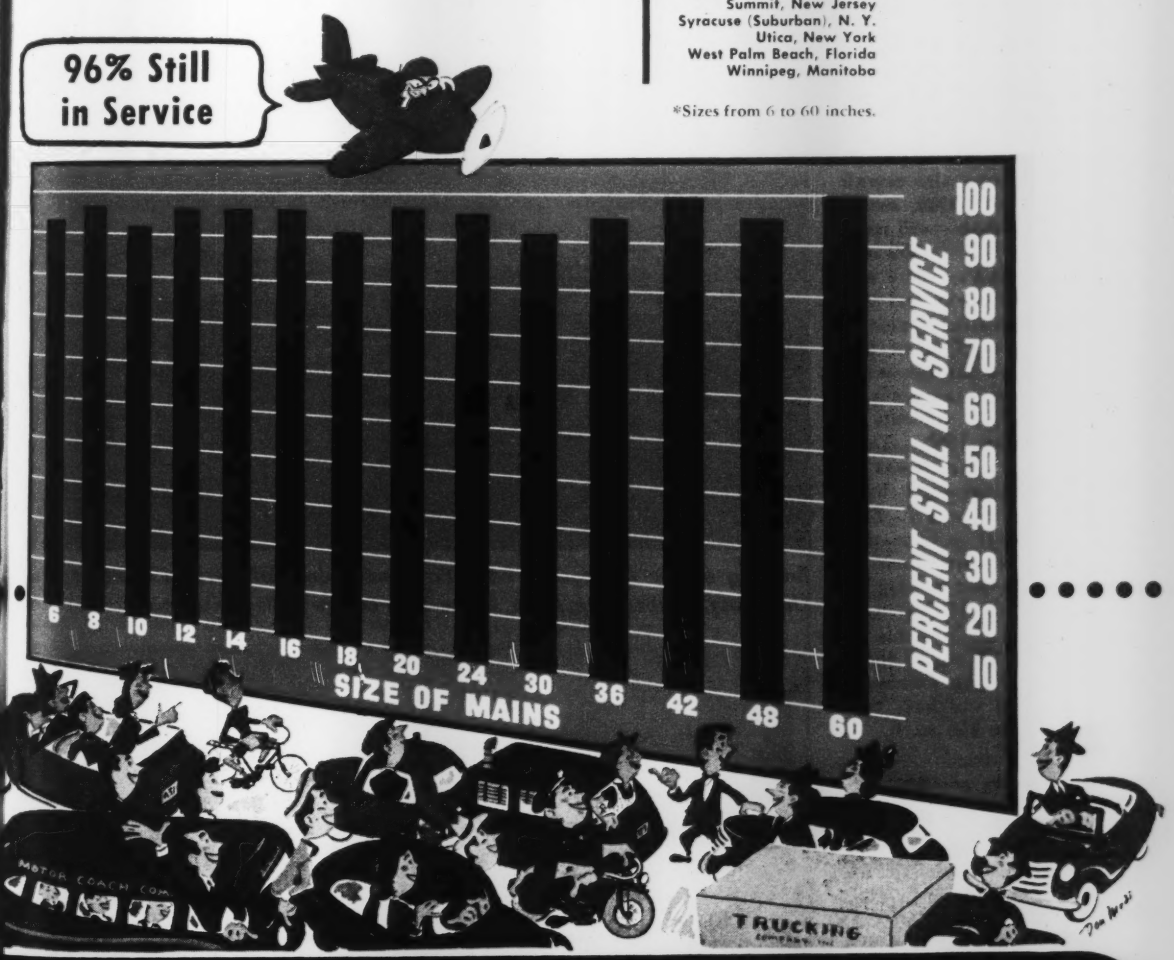
# CAST IRON PIPE

# E THEIR OWN $64 QUESTION!

% OF ALL CAST IRON WATER MAINS LAID THESE 25 CITIES OVER A PERIOD OF YEARS ARE STILL IN SERVICE.

Alexandria, Virginia
Babylon, New York
Clinton, Iowa
Clyde, New York
Denver, Colorado
Des Moines, Iowa
Detroit, Michigan
Huntington, West Virginia
Jamaica, New York
Merrick, New York
Norwich, New York
Ottawa, Ontario
Philadelphia, Pennsylvania
Portland, Maine
Rochester (Suburban), N. Y.
St. Mary's, Pennsylvania
St. Paul, Minnesota
Sag Harbor, New York
Scranton, Pennsylvania
Springfield, Massachusetts
Summit, New Jersey
Syracuse (Suburban), N. Y.
Utica, New York
West Palm Beach, Florida
Winnipeg, Manitoba

*Sizes from 6 to 60 inches.




# E SERVES FOR CENTURIES

# Colleges have a $1 billion construction program

A $1,000,000,000 construction program is now being carried out by 1,376 American institutions of higher education and they are planning $2,600,000,000 of additional work, a survey now being completed jointly by the U. S. Office of Education and the Federal Works Agency reveals. This program is somewhat larger than preliminary figures indicated last May (*ENR* May 22, vol. p. 856). The complete study will be published as a bulletin of the Office of Education in the spring.

The 1,376 colleges and universities,—representing 95 percent of the total enrollment in such schools—report that they now have projects under way providing 43,800,000 sq. ft. of non-housing space and 36,342,000 sq. ft. of residential space. Between now and 1950 these institutions will need a total of 184,690,000 sq. ft. of additional space costing $2,600,000,000.

### *Big increase in enrollment*

The colleges report an enrollment of 2,340,000 students, of whom 48 percent are veterans. The survey also reveals that by the fall term of 1949, enrollment in the schools probably will reach 2,561,000 and by the fall of 1959 over 2,800,000. These figures compare with the recommendation by the special commission on higher education appointed last year by President Truman that federal aid be provided through scholarships and other means to permit an enrollment of 4,600,000 students in these same schools by 1960. These recommendations were in a report released in December, prepared by a committee headed by George F. Zook of the American Council on Education.

Before the war the institutions reporting had sufficient non-housing facilities to provide about 175 sq. ft. of floor space per student. Now this figure is approximately 125 sq. ft. and if all of the work now being planned is carried out, the space will have been increased to only about 155 sq. ft.

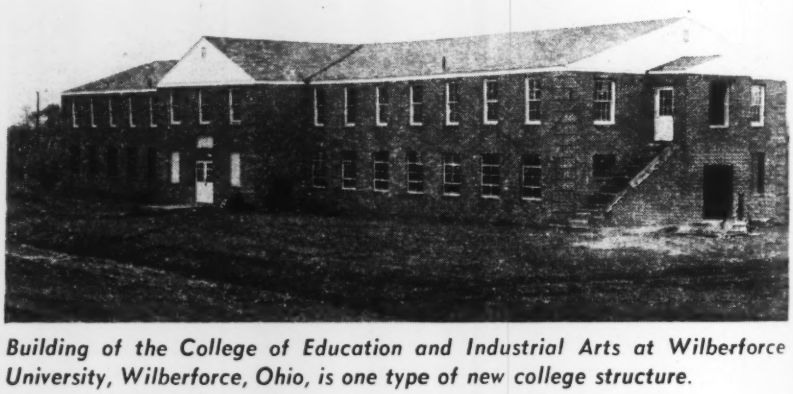
### *Financing appears possible*

To determine if the institutions making extensive building plans can finance the work adequately, a sample study of 106 representative institutions in 43 states (with a total enrollment of 475,000 students last fall) was recently completed. This study showed that these schools had $240,000,000 actually available for their expansion plans and that late in 1947 they had under contract $80,000,000 of work to be financed with this money. These same schools have also been authorized to issue revenue bonds for self-liquidating projects to the amount of $40,000,000. The latter facilities would include dormitories, union buildings, and athletic facilities. From this study, Ernest V. Hollis, chief of the Veterans Education Facilities Program of the U. S. Office of Education has concluded that many institutions are now in a financial position that will permit them to go ahead with construction of much needed projects.

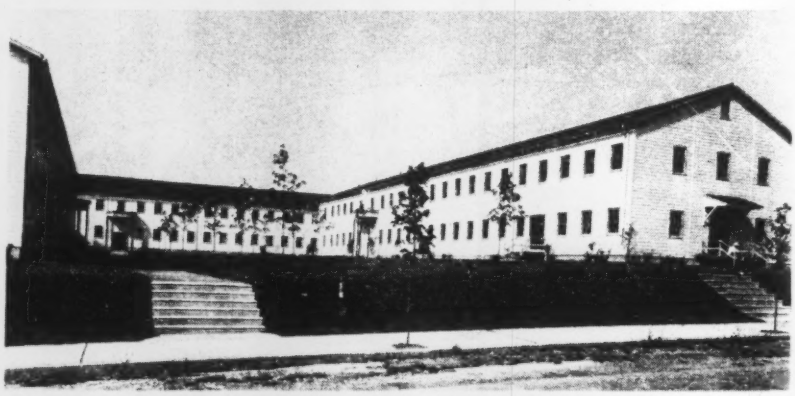
The Bureau of Community Facilities of the FWA late in 1947 reported that it had used several thousand surplus war structures to provide 15,000,000 sq. ft. of floor space for institutions training students under Title II of the Servicemen's Readjustment Act of 1944. This work was done between August 1946 and December of 1947 under authority of Public Law 697 of the 79th Congress. At first an appropriation of $75,000,000 was provided. To this was added a $5,000,000 balance from the Lanham Act appropriations and later $3,000,000 was made as a restricted appropriation by the 80th Congress during its first session.

All types of structures have been acquired by the bureau. In general, buildings in hospital areas of military installations have been found most satisfactory for removal. Barracks of certain types are the most suitable for dismantling for the use of their component materials. In a report dated late in 1947, Commissioner George H. Field of the bureau reported that 5,650 surplus buildings had been assigned for transportation and re-erection and that 1,400 structures had been dismantled.

A large number of other buildings now devoted to educational purposes are being utilized under FWA authority on the occupied sites, generally on federally-owned property convenient to a school. Where buildings have been transferred and re-erected on campus sites it is the general policy of the FWA to turn over possession and ownership of the installations when they are completed. Most of the structures provided by FWA are expected to be good for from 5 to 20 years.



*Building of the College of Education and Industrial Arts at Wilberforce University, Wilberforce, Ohio, is one type of new college structure.*



*This big classroom structure on the freshman campus at Cedarbrook is a project of Temple University, Philadelphia, Pa. Barracks were moved in panels from the Naval Operations Center at Solomons Island, Md.*

## OBITUARY

**John T. Funda, 65, president of** the Funda-Austin Construction Corp., Syracuse, N. Y., died Jan. 13. He headed a general contracting concern started more than 100 years ago by his grandfather, William Funda, and carried on by his father, Henry Funda, who died in 1938. The firm has done construction and remodeling work on nearly every store building in downtown Syracuse. Mr. Funda was an expert appraiser.

**Thomas O'Sullivan,** 74, died at Montreal, Que., Jan. 5. He was graduated as an engineer from the Royal Military College, Sandhurst, England, and served in the South African War as a captain in the Royal Military Engineers. He went to Montreal and formed a construction company. Later he joined the staff of the National Harbors Board of Canada, and still later was a surveyor for the Province of Quebec.

**John S. Fenner,** 63, county engineer of Bee County, Tex., died at Beeville, Jan. 13.

**William Charles Fisher,** 46, Harris County (Houston), Tex., Flood Control District field engineer, died at Houston Jan. 11. He was educated at the University of Texas and was active in construction work throughout the Southwest for a quarter of a century.

**E. H. Neuhart,** 61, county highway engineer at Bolivar, Mo., for 30 years, died there recently.

**Chairman Clark E. Mickey,** 64, of the University of Nebraska civil engineering department, died at Lincoln Jan. 15. Professor Mickey had headed the department since 1920 and had been active as a consulting engineer for several power and irrigation districts. He was graduated from the university in 1908 and became an instructor. Later he was assistant professor in the college of engineering and in 1920 became full professor.

**Hugh Jack,** 70, construction engineer, who supervised the iron work of the Princeton University gymnasium, and the erection of the flagpole atop the Singer Building, New York City in 1908, died in New York Jan 14. He had been supervisor of the American Bridge Co. and the George A. Fuller Co.

**Percy E. Hicks,** 70, formerly assistant city engineer of Redlands, Calif., and an active developer of the Big Bear Lake, Calif., irrigation project, died Dec. 31. He had been a consulting engineer in Redlands for a number of years.

**James S. Haley,** Niles, Ohio, construction engineer, died Dec. 30. He formerly had his own firm, the Haley Construction Co., and more recently was with Wilputte Construction Co. in building coke ovens for Bethlehem Steel Co. Several years ago he was with Walsh Construction Co., Davenport, Ia., and later with the Haley-Holley Construction Co., Pittsburgh, Pa.

**Gerald Scott Jones,** 52, for 19 years engineer of Winnebaga County, Iowa, died at Forest City Jan. 12. He was a graduate of Iowa State College.

**Shaler C. Houser,** 68, for 36 years treasurer and engineering professor at the University of Alabama, died Jan. 11. For many years he was in charge of all the university's construction. Prior to joining the faculty in 1912 he was assistant city engineer of Mobile and a general contractor. For a time he did civil engineering for railroad construction in Cuba.

**Shelburne M. Warner,** of Clinton, S. C., supervisor engineer of the J. A. Jones Construction Co., of Charlotte, N. C., was killed Jan. 13 in the crash of an Eastern Air Lines plane near Washington, D. C.

## MAJOR MEETINGS

**Associated General Contractor of America, Inc.,** 29th annual convention, Adolphus and Parker Hotels, Dallas, Tex., Feb. 9-12.

**Associated Equipment Distributors,** 29th annual meeting, Edgewater Beach Hotel, Chicago, Ill., Feb. 15-19.

**U. S. Conference of Mayors,** annual conference, Waldorf-Astoria Hotel, New York, N. Y., Feb. 16-18.

**National Association of Home Builders,** Stevens and Congress Hotels, Chicago, Ill., Feb. 22-26.

**American Concrete Institute,** annual convention, Shirley-Savoy Hotel, Denver, Colo., Feb. 23-26.

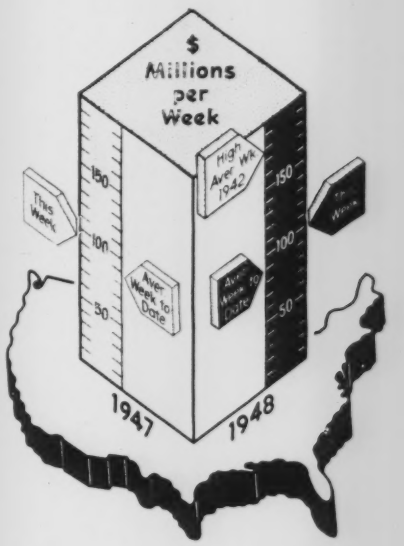
**Association of Highway Officials of North Atlantic States,** 24th annual meeting, Hotel Traymore, Atlantic City, N. J., March 3-5.

**Mississippi Valley Conference of State Highway Departments,** Edgewater Beach Hotel, Chicago, Ill., March 11-13.

**American Concrete Pipe Association,** Hotel Roosevelt, New Orleans, La., March 12-13.

**Chicago Technical Conference,** Stevens Hotel, Chicago, Ill. March 22-24.

## CONSTRUCTION ACTIVITY




As Reported this week to . . .
*Engineering News-Record*

### CONTRACT VOLUME

**Continental U. S. Only (Thousands of Dollars)**

| | Week of Jan. 29 1948 | Cumulative 1948 (5 wks.) | Cumulative 1947 (5 wks.) |
|---|---|---|---|
| Federal .... | $7,455 | $56,167 | $42,188 |
| State & Mun. | 45,614 | 178,259 | 107,867 |
| Total Public. | $53,069 | $234,426 | $151,055 |
| Total Private | 46,614 | 207,529 | 279,915 |
| **U. S. Total..** | **$99,683** | **$441,955** | **$430,970** |

### WHERE CONSTRUCTION ACTIVITY ORIGINATED THIS WEEK

**Dollar Volume (Thousands)**

| Type of Work | This Week | Cumulative 1948 (5 wks.) | Cumulative 19 7 (5 wks.) |
|---|---|---|---|
| Waterworks ... | $2,395 | $19,030 | $14,858 |
| Sewerage ..... | 5,750 | 15,130 | 7,934 |
| Bridges ..... | 1,993 | 18,930 | 9,573 |
| Highways ..... | 14,291 | 65,564 | 38,565 |
| Earthwork, Waterways ..... | 8,005 | 28,028 | 8,694 |
| Buildings, Public | 19,093 | 69,818 | 51,442 |
| Industrial ... | 19,872 | 50,974 | 77,680 |
| Commercial .. | 23,302 | 139,299 | 187,767 |
| Unclassified ... | 4,982 | 35,122 | 34,457 |

NOTE: Minimum size projects included are: Waterworks and waterway projects, $28,000; other public works, $50,000; industrial buildings, $68,000; other buildings, $250,000.

### NEW PRODUCTIVE CAPITAL

| | Cumulative 1948 (5 wks.) | Cumulative 1947 (5 wks.) |
|---|---|---|
| NON-FEDERAL ... | $225,850 | $108,413 |
| Corporate Securities | 115,810 | 5,670 |
| State and Municipal | 110,040 | 102,743 |
| **Total Capital.....** | **$225,850** | **$108,413** |

### ENR INDEX NUMBERS

| Index Base = 100 | | 1913 | 1926 |
|---|---|---|---|
| Construction Cost. | Feb. '48 | 436.89 | 210.01 |
| Building Cost..... | Feb. '48 | 329.71 | 178.23 |
| Volume ..... | Jan. '48 | 175 | 77 |

# CONSTRUCTION REPORTS

## Bids Asked—Low Bidders—Contracts Awarded

*Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.*

*ELSIE EAVES, Manager* *J. A. MAHONEY, Reports* *E. R. BIGGERSTAFF, M. R. ROESSLER, Statistics*

## WATER SUPPLY

**Construction Reports received since this section went to press will be found in Last Minute Construction Reports.**

**BIDS ASKED**

*Bids Asked February 2*

**Md., Salisbury**—Mayor and Council, City Hall, 2 production test wells, 6 in. diam. equipped with at least 20 ft. screen driven to 125 ft. depth; 4 to 8 two in. observation wells driven to depth not exceeding 125 ft., Constr. 1-48-W. Plans deposit $10.

*Bids Asked February 3*

**Md., Hyattsville**—Washington Suburban Sanitary Comn., Hamilton St., approx. 8,300 ft. 6- to 12-in. c.i. watermains and 6,200 ft. 6- and 8-in. plain concrete or vitr. sewers and sewer house connections, Indian Spring Manor and vicinity, Contr. 413-W & S. Plans deposit $5; adv. ENR 1/29.

*Bids Asked February 4*

**Tenn., Bolivar**—State Charitable & Penal Institutions, State Office Bldg., Nashville, 300,000 gal. elevated steel tank and foundation at Western State Hospital for Insane. Plans deposit $10. J. Frazier Smith, Goodwyn Institute Bldg., Memphis, engr.

*Bids Asked February 9*

**N. Y., Tonawanda**—Town of Tonawanda, Kenmore, water lines. $77,000. CD 3/19/45—ENR 4/5/45.

*Bids Asked February 16*

**Va., Richmond**—At office J. W. Huffman, city purch. agt., City Hall, addns., modifications to Water Purification Plant 2 of Dpt. of P. Utilities. Plans deposit $50. CD 12/11/44—ENR 12/28/44.

*Bids Asked February 17*

**†Arizona**—Bureau Reclamation, Dpt. Interior, Bldg. 1A, Denver Federal Center, Denver, Colo., 5,000 to 10,000 gal. elevated steel water tank at Pumping Plant 1, near Yuma, (Lower Colorado River District—Region 3), Gila project, Spec. LCRD-2. W. R. Young, Bldg. 1A, Denver Federal Center, Denver, Colo., ch. engr.

*Bids Asked February 19*

**Minn., Roseau**—Village, H. Monsrud, clk., about 19,800 lin. ft. 6 and 8 in. c.i. watermain, incl. special river crossing and accessories. $70,000. Plans deposit $30. Pfeifer & Shultz, 702 Wesley Temple Bldg., engrs.

*Bids Asked February 24*

**Tex., Waco**—City, H. Davis, water supt., 2½ m.g. rein.-con. water reservoir. $125,000. Plans deposit $25. Joe J. Rady, 811 American Fidelity Bldg., Fort Worth, engr. CD 10/11/44—ENR 11/20/44.

*Bids Asked About March 15*

**La., Gretna**—City, exten. watermains. $300,000. Alvin E. Hotard, Gretna, engr. CD 3/7—ENR 3/13.

*Bids Asked March 1*

**Puerto Rico, San Juan**—Puerto Rico Aqueduct and Sewer Service, at office Buck, Seifert & Jost, consult. engrs., 112 E. 19 St., New York 3, N. Y., Sect. D Rio Grande de Loiza Water Supply Development, near here. Plans deposit $10; adv. ENR 1/29.

*Bids Asked*

**Tex., Dallas**—Robert M. Bruton & W. A. Blair, Pleasant Grove Dr., Dallas, water lines and facilities, Pleasant Grove. $50,000.

**LOW BIDDERS**

**Calif., Sacramento**—State Div. Architecture, P. Wks. Bldg., Jan. 20, water development project (water lines, storage tanks, etc.) at Pfeiffer Big Sur State Park, Monterey Co., from Ferguson Bros., 10524 Graffian St., Oakland. $78,392. Anson Boyd, Sacramento, state archt.

**D. C., Wash.**—Dist. Comrs., District Bldg., Jan. 9, 891 lin. ft. 30 in. and 7,839 lin. ft. of 20 in. watermains from 4 and B Sts. N.E. to Potomac and Kentucky Aves. S.E., from A. J. Ellis Constr. Co., 1178 Morse St. N.E. $194,209. CD 12/17—ENR 12/25.

**Ind., Westville**—State Procurement & Supply Div., O. F. Heslar, dir., 404 State Capitol, Indianapolis, Jan. 21, water equip. for State Mental Hospital, near here, wells and pumping equip., from Layne-Northern Co., Mishawaka, $21,900, elevated steel tank, from Pittsburgh-Des Moines Co., 38 S. Dearborn St., Chicago, Ill., $98,000. CD 1/1.

**Ky., Bowling Green**—City, W. H. Funk, clk., City Hall, Jan. 6, from W. L. Hailey & Co., Cotton States Bldg., Nashville, Tenn., expan. filtration plant $355,173; electrical work, $25,026; distr. mains, $282,236; repairing reservoirs, $14,050; covering reservoirs, $87,851. CD 11/26—ENR 12/4.

**Tex., Dallas**—Dallas Co. Water Control & Imprvt. Dist. 5, St. Augustine at Summitt St., Jan. 12, distr. sys., from Mitchell Darby Constr. Co., Pharr, $189,550; water supply well, from J. L. Myers & Sons, 5306 Harry Hines Blvd., Dallas, $25,368. CD 12/30.

**Tex., Galveston**—City, Jan 8, booster pump station, alterations, imprvs., from J. W. Zempter, 65 and Broadway. $39,222. Est. $126,000. CD 1/5—ENR 1/8.

**CONTRACTS AWARDED**

**Ga., Atlanta**—East Wesley Apartments, Inc., c/o contractor, water and sewerage sys., for apartment development, to M. T. Lambert Co., 200 Peachtree Circle N.E. Est. over $50,000.

**†Ga., Ft. McPherson**—Purchasing & Contracting Office, Dec. 18, 200,000 gal. reservoir, to J. J. Cohen, Jr., 1531 Piedmont Ave., N.E. Atlanta, approx. $35,000. Bids 12/18, awarded 1/15. CD 12/12.

**Md., Cumberland**—Mayor and City Council, Cumberland, Evits Water Co. auxiliary water line, to Cumberland Contg. Co., Cumberland, $744,830. Bids 11/3, awarded 11/12. CD 11/17—ENR 11/20, under LB.

**N. J., Hammonton**—Hammonton Bd. Water Comrs., Hammonton, WW addns. Owner builds. Over $35,000.

**N. C., Newton**—Town, L. E. Sigmon, clk., WW imprvs., to Gilbert Eng. Co., Statesville. $262,071. Bids 1/14. CD 12/22—ENR 1/1.

**Pa., Phila.**—Dpt. P. Wks., City Hall Annex. to Conduit & Foundation Corp., 770 S. Schuylkill Ave., watermains various locations WWI 384, $119,712; WWI 384, $19,812; WWI 383, $122,608***to Wallace & Tiernan Co., Inc., 1649 N. Broad St., Queens Lane Filter Plant addns., WWI 360, $11,391. Grand total $333,523. CD 11/24/44—ENR 12/14/44.

**Wash., Seattle** — City, County-City Bldg., Zone 4, 33,500 ft. c.i. pipe for water sys. imprvs., to U. S. Pipe & Foundry Co., Colman Bldg. $75,835. Bids 12/16. W. C. Morse, water supt.

**Wash., South Cle Elum**—Town, Town Hall, water supply and distr. sys. with 28,580 ft. 6 and 8 in. steel pipe, to Matt Malaspina, 1803 30 Ave. S., Seattle. $80,062. Bids 1/17. CD 12/31—ENR 1/8.

### PROJECTS COVERED

***Projects—By Size***

**Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterworks $28,000; other public works $50,000; industrial buildings $68,000; other buildings $250,000.**

***Classes of Construction***

(Name in order of Listing)

| | |
|---|---|
| Water Supply | Latin America |
| Sewers, Waste Disposal | Public Buildings |
| Bridges | Commercial Buildings |
| Streets & Roads | Industrial Buildings |
| Earthwork, Waterways | |

Unclassified

***Stages Reported***

PROPOSED WORK: Including appointment of engineers or architects.

BIDS ASKED (new announcements only). For full calendar, see also preceding issues of ENR.;

LOW BIDDERS: On jobs below $500,000 value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: Except awards to low bidders previously reported in low bidder stage.

Dates shown are of issue in which last previous report was published.

***Symbols and Abbreviations Include:***

| | |
|---|---|
| † | Federal Government |
| ● | Project of $1,000,000 or over. |
| ENR | Engineering News-Record |
| CD | Engineering News-Record Construction Daily |

## SEWERS, WASTE DISPOSAL

**Construction Reports received since this section went to press will be found in Last Minute Construction Reports.**

**BIDS ASKED**

*Bids Asked February 6*

**O., Cleveland**—City manager, City Hall, incinerator bldgs. at City Yard, Ridgefield Rd. $119,000. Havens & Emerson, 1140 Leader Blvd., engrs. CD 4/16/46—ENR 5/2/46.

*Bids Asked February 9*

**Md., Delmar**—Town Comrs., exten. sanitary sewerage sys., 6,230 lin. ft. 6- to 8-in. I&S standard weight vitr. clay sewer pipe, 14 brick manholes, complete with c.i. frames and covers, 9 sq. yd. rein.-con. road replacement, 1,300 sq. yd. asphalt street replacement, 1,100 sq. yd. dirt surface replacement. Plans deposit $20. V. W. Burr Associates, Salisbury, engrs.

**Nev., Reno**—T. L. Taylor, city clk., City Hall, outfall sewer, pumping plant, appurtenant facilities, incl. force main between said pumping plant and sewage treatment works, etc. Plans deposit $20.

**N. Y., Tonawanda**—Town of Tonawanda, Kenmore, sanitary sewers in township. $94,500. CD 10/27/44—ENR 11/16/44.

**Okla., McAlester**—City, sewage disposal plant. $240,000. Plans deposit $25. Rex Collins, city engr. CD 8/13/45—ENR 8/23/45.

**Wash., Wenatchee**—City, City Hall, 20,000 ft. 8- to 36-in. rein.-con. and concrete interceptor sewers. $50,000. J. Dunstan, city engr. CD 7/12/45—ENR 7/26/45.

*Bids Asked February 10*

**Miss., Starkville** — City, Group 1, sewage treatment plant; Group 2, sanitary sewer collection sys. extens., Plans deposit $40 and $25 respectively. Winchell C. Webb, 404 Barnett-Madden Bldg., Jackson, engrs. CD 12/8—ENR 12/11.

*Bids Asked About February 15*

**Ky., Mount Sterling**—City, sewage treatment plant and sanitary sewer extens. Over $50,000. J. Stephen Watkins, 145 E. High St., Lexington, engr. Plans deposit $25. CD 10/22—ENR 11/11.

*Bids Asked February 17*

**N. J., Plainfield**—F. Martin, Secy. Joint Meeting City of Plainfield, North Plainfield and Dunellen Boros, City Hall, Contr. A, general construction imprv. joint sewage disposal plant, lined steel stack and spray chamber, and oil burner installation and tank, in Middlesex Boro. Plans deposit $20. Elson T. Killam, 140 Cedar St., New York, N. Y., consult. engr.

*Bids Asked February 19*

**Minn., Roseau**—Village, H. Monsrud, clk., approx. 21,810 lin. ft. 8- to 12-in. vitr. clay tile sanitary and 11,010 lin. ft. 12- to 36-in. concrete storm sewers, etc. $230,000. Plans deposit $30. Pfeifer & Shultz, 702 Wesley Temple Bldg., Minneapolis, engrs. CD 11/1/45—ENR 11/29/45.

**†Nebraska**—U. S. Eng., 1709 Jackson St., Omaha, Zone 2, Grace Street Sewer and Pumping Station, Unit V Sect. I, at Omaha. Serial No. W-25-066-eng-48-273. Extended date. CD 1/9—ENR 1/15.

*Bids Asked March 23*

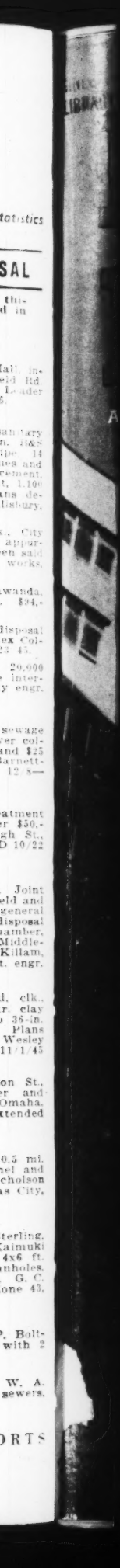
**Mo., Kansas City**—City, City Hall, 0.5 mi. 48- to 84-in. sanitary sewers incl. tunnel and railroad crossing. Prospect and Nicholson Sts. Reed McKinley, City Hall, Kansas City, dir. P. Wks. CD 11/10—ENR 11/27.

*Bids Asked March 4*

**T. H., Honolulu**—At Office Leon K. Sterling, City and Honolulu Co. Clk., Manoa-Kaimuki Interceptor Exten., approx. 6,000 ft. 4x6 ft. tunnel, 2,000 ft. 42 in. sewer pipe, 6 manholes, 7 special manholes, etc. Job No. 25-47. G. C. Wallace, Div. Sewers, 501 City Hall, Zone 43, engr. CD 1/19—ENR 1/22.

*Bids Asked April 5*

**Mich., Spring Lake**—Village, John P. Bolthouse, clk., approx. 8,000 ft. sewers with 2 lift stations.

*Bids Asked*

**Tex., Dallas**—Robert M. Bruton & W. A. Blair, Pleasant Grove Dr., sanitary sewers, Pleasant Grove. $65,000.